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LIFE SHORTENING HABITS

AND

REJUVENATION

I. The Ten Chief Life Shortening Habits
II. The Rapid Ageing of Women
III. Rejuvenation

BY

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Carlsbad, Czecho-Slovakia

PHILADELPHIA
F. A. DAVIS COMPANY, PUBLISHERS
1922

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PART I

The Ten Chief Life Shortening Habits

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INTRODUCTION

TO PART I

THIS book saw the light of the world under the roof of an old convent in Vienna, the monastery of the Capuchin fathers, who offered me hospitality and gave me board and shelter during the last two years of the World War and for a few months after its termination.

After performing my daily duties as a medical officer it was here that I retired for the evenings and nights. It was a quiet place, an isle of silence in the midst of a noisy city, and just the place for contemplation and literary work. And very silent neighbors I had, indeed! Below me in the deep vaults of the convent lay, in sarcophagi of silver and copper, the bodies of all the emperors, empresses, archdukes, and archduchesses of the imperial and royal house of Austria-Hungary who had died in the preceding four centuries, including that of the son of the great Napoleon, from his union with the Austrian princess, Maria Louisa.

Looking out of my window into the courtyard, I faced a skull bearing an imperial crown of iron which formed the top of the mausoleum of the great Empress Maria Theresa.

My mind, moreover, was far from cheerful, as

I had been the witness of so much misery and had besides lost my personal fortune, the savings of many years of hard toil, in consequence of the war. But then, there were millions who fared far worse than I: Those who lost their lives or had bodily wounds inflicted upon them; and far greater, I think, than the loss of life or bodily wounds of many thousands is the moral mischief that resulted from the late war and which has been poisoning the minds and souls of untold thousands.

A huge wave of materialism has spread over the world. It seems as if all idealism and altruism had been effaced in the average man. There is a general unwillingness to do work of any kind, and instead of working the more in order to build up what was lost through the war, on the contrary people are working less, yet unwilling to renounce the benefits that should be reaped only by those who are working the hardest. Besides, there has arisen an enormous over-valuation of crude physical labor at the expense of the more subtle and far more important work of the brain, thus exposing the brainworkers to hardships and poverty. This means, indeed, the triumph of the body over the mind! There also has arisen a general craze to enjoy in full measure the pleasures of the moment, regardless of the unfortunate after-effects and dire consequences.

Introduction

In this book I endeavor to show, on the basis of examples drawn from Nature, that each of the creatures of the Almighty Creator, be it man or animal, is destined by Him to do some kind of work, and that Nature, herself, teaches us to do good. That, through the teachings laid down herein, some human life may be prolonged and premature death prevented is my earnest hope.

I

ALCOHOL

IT is a well-known fact that alcoholic beverages in large amounts are deleterious to all men. There are many persons, too, who are unable to take them even in small amounts without injury to their health. But if anybody should claim that small quantities of an alcoholic beverage, such as beer or wine, are harmful to all adults, he would certainly be making a statement that could not be supported by any argument of scientific value, so far as I know.

If there are still some who maintain the view that wine or beer, even in small, limited quantities, are deleterious to the health of all adults, I would acknowledge their praiseworthy endeavor to combat the scourge of alcohol, but perhaps not their good faith as regards the truth of their pretention if they were well up in physiology, pharmacology, and experimental pathology. I could not follow them as far as that, for they would be exceeding the limits of reason, and instead of helping the good cause, would rather harm it by statements and opinions that are contrary to truth and to common sense.

It seems absurd to me that because there are men who can never drink a glass of wine or take a drop of whisky without emptying the whole bottle, all those should be punished who are able to be moderate in their use of these beverages, and that on account of the sins of the others they should not be allowed to enjoy a little wine, a glass of beer, or a drop of whisky as recreation after a hard day's toil.

Where is the due sense of wise moderation in those who are fighting alcoholism? If a person is combating immoderation, the very least I should expect from him would be that he should himself be moderate in his actions and not fall into the same error that he is combating by showing immoderation and fanaticism in pursuing his ends. For by such fanaticism he would show himself possessed of the mental deficiency of all fanatics, lack of judgment, and this would certainly not be of a nature to carry conviction to those who are to be converted and brought back to the path of virtue. What we must do is to convince by arguments and reasoning those who err.

I believe I can speak impartially on the question of alcohol, for I may call to witness my many friends in America and England that I do not drink any alcoholic beverage and never had drinking habits. I never turned Paul from having been

Saul, which certainly cannot be said to apply to all those who are now bitterly fighting alcoholism. How human it is to hate what we once loved! When we have professed the greatest affection or liking for a person or thing, and when for some reason or other the friendship or liking ends, and we become enemies, then our hatred grows just as great as our friendship had been before. Those who are converted to a new religion are very apt to become fanatics in it.

While I do not drink, I do not claim this as one of my virtues. I do not drink because—I know I differ in this peculiarity from other men—alcoholic beverages have never been pleasing to my palate, and, heaven be praised, I never feel the necessity of stimulants!

I feel I must adhere to the actual, simple truth if I want the large congregation of healthseekers to lend their ears willingly to my teachings, and I am fully aware of the fact that I dare not make myself guilty of any exaggeration if I want to convince!

Now it would really be an exaggeration if I should maintain that alcohol is harmful even in small quantities to adults. That it is extremely dangerous to children in small quantities and impairs their capacity for learning and their intellect in general is a fact upon which I have already

laid stress in my book on "Building Human Intelligence."

But that alcohol in small quantities is not dangerous to grown up persons is a fact referred to in every manual on pharmacology, wherein it is likewise stated that in small doses it is a useful tonic to the heart, and thus a serviceable medicine. Of course it is not well to use drugs daily; hence it would not be wise to take daily such a dose of wine or whisky, for instance, as would increase the pulse rate, cause the heart to beat more strongly, and induce a sensation of heat.

For daily use, if one does not prefer in the interest of longevity to entirely renounce alcoholic beverages, two small glasses of wine of low alcohol content, or a glass of beer, is enough. It would not become one preaching moderation to recommend more than that amount. It is better still, of course, if people can be so brought up from childhood that they will not feel the need of such stimulants.

For children every drop of alcohol is a real crime, and should be severely punished by law. But it would certainly be advisable, too, that grown up people should consider alcohol rather as a kind of occasional medicine. With alcohol it is as with all other drugs and medicine; if you take much of it, it will turn into a poison. It excites undue activ-

ity of certain glands, the ductless or endocrin glands, *i.e.,* the thyroid, liver, kidneys, adrenals, pituitary body, and the sexual glands, and thus contributes to their degeneration.

The great importance of these glands which, after the brain, heart, and lungs, are the most important organs of the body, has been described in a masterly way by an American savant, Dr. Charles E. de M. Sajous, of Philadelphia, in his classical work on "Internal Secretions," the first book on this subject to be contributed to the medical literature in the entire world.

The first organ to suffer from alcohol is the liver, to which it is conveyed directly from the intestinal tract. Among the duties of this organ is that of ridding our body of the different poisons that are brought to it with the blood from the digestive organs and which we introduce into our body with food and drink. The alcohol thus carried to the liver induces inflammation of its tissues, and in the long run may bring about the destruction of this most important organ.

Further, an accumulation of large quantities of water in the abdominal cavity, ascites, may take place, so that the abdomen becomes distended like a barrel. The drunkard, as punishment for the pleasures he has derived from tapping a barrel, is thus condemned by the vengeful hand of Nature

to carry such a barrel in his own person through the remaining years of his life, which can be maintained only by repeated tapping of the accumulated fluid.

What makes the ravages of alcohol so serious, both for the body and the mind, is the fact that it is also most deleterious to a glandular structure which, as shown through the labors of Dr. Sajous, and as also described in my books "Old Age Deferred" and "Building Human Intelligence," governs all the functions, physical and mental. As previously mentioned, I have attributed early ageing and old age in general to changes occurring in this gland, and by extracts from it I have succeeded in restoring people to a more youthful appearance. It is interesting to note that recently Huxley, in London, has succeeded in obtaining similar results in his experimental work.

I have also shown in my book on "Building Human Intelligence" that this wonderful gland governs the condition of the brain and the entire nervous system, and that upon giving extracts of it to idiots, cretins, and feeble-minded persons, marked improvement of the mental condition may take place. In a book I have just finished, on forgetfulness and absentmindedness, I show that through their use the memory can likewise be improved.

In cases of idiocy, cretinism and feebleminded-ness, the best results are obtained if the treatment is begun in childhood. Thus, in the summer of 1919 I treated a feeble-minded and quite dumb child of 4 years with thyroid extract, with the result that after six weeks the child became more intelligent and was better fitted for education, and had begun also to pronounce several words distinctly. Since then she has made great progress, as her mother informed me by letter. The treatment is being continued. Very often such children are the offspring of families upon which alcohol has been exercising its nefarious influence.

Just as goiter, that is, enlargement of the thyroid gland, may be hereditary, so may various morbid changes and diseases of the thyroid be transmitted from the father or from the mother to the later descendants, often even through a number of generations. Even ordinary intoxication is attended with disturbances in the function of the thyroid gland, and if intoxication occurs frequently in a person, permanent and destructive changes in the organ may result—as has been demonstrated by a number of investigators studying the thyroid of dead alcoholics—and consequently also the development of mental disturbances and finally insanity.

Now, since the thyroid plays the most important rôle among the detoxicating and protective organs

of the body, the resisting power of the body against various poisons and infectious germs is diminished by morbid changes in it induced through the action of alcohol, and in those with severe alcoholism may even be entirely abolished. The fact need not surprise us, therefore, that alcoholics quickly succumb to all kinds of infection. Contracting an inflammation of the lung may be attended with particular danger to life in alcoholics. Death often results within a few days in these cases. In this disorder, indeed, everything depends upon the strength of the heart, which must therefore be stimulated by all available means. The heart of the alcoholic is, however, as a rule in a weak condition, since alcohol in large amounts injures the heart muscle and reduces the functional power of this organ.

Alcohol exerts an equally harmful influence on the condition of the blood-vessels, and arteriosclerosis is exceedingly often found present in drinkers. The occurrence of arteriosclerosis in these subjects, frequently while they are still relatively young, is likewise to be accounted for in part by the diseased condition of the kidneys induced by alcohol. Alcohol has an extremely harmful effect on the delicate, sensitive tissues of these highly important organs, and is often responsible for the development of inflammation of the kidneys (nephritis), which markedly shortens life.

Thus we see that alcohol harms a number of the organs which are essential to life, and therefore constitutes one of the most frequent causes of premature demise, or at least of early ageing.

What makes this butcher of humanity especially fatal, however, is that it not only destroys the drinker but also plunges his innocent descendants into misfortune and even in many instances consigns them to an early grave.

Alcohol impairs the very germ upon which a future human existence is founded. It may often occur even on the wedding night that a child is begotten, while its parents are in a state of intoxication, which will have to suffer from this circumstance throughout life, for such children, as is generally the case in the offspring of alcoholic parents, do not thrive well, possess little resisting power against the various infections, and frequently show a tendency to scrofula. Indeed, tuberculosis develops with particular ease in the favorable soil thus produced. As I showed in my previous works, disorders of the thyroid gland are transmissible to the offspring (goiter, for example, being frequently transmitted), and as the thyroid gland governs the development of the bones, the children of alcoholics are often backward in their growth. Especially notable among children begotten during intoxication, as in general among the offspring of drinkers,

is a very marked nervousness, and spasms or tremors in the limbs appear very often in small children thus engendered. Later, these children very frequently grow up to be neurasthenic men and hysterical women; fondness for alcohol on the part of parents is one of the commonest causes of inherited neurasthenia, hysteria, or epilepsy, which is then further transmitted to the children.

What makes conditions especially tragic is that the children of drinkers often harbor a tendency toward alcohol from childhood on. Not that the pleasant taste of wine or beer proves particularly enticing to them—even in the true drinker this property alone has little influence in leading him toward drink—but in such persons there often appears a state of mental depression, itself often due to physical causes (the mind generally being under the influence of the physical processes of life), which leads them to feel a need of freeing themselves from their weakness and lassitude and of cheering themselves up, and as a result the bottle is soon resorted to. An abnormal condition of the mind is of exceedingly frequent occurrence among the children of alcoholics, and definite mental disturbances in many instances make their appearance among them. Even idiotic, mentally backward, or otherwise abnormal children are brought into the world from such unions, and unfortunately such

mental impairment is often further transmitted to the succeeding generations.

In this we observe a condition similar to that noted in syphilis, these two scourges of mankind, indeed, generally being in close inter-relationship. Alcohol is an accomplice and abettor of syphilis, for which it often prepares the ground, representing the biblical snake which induced man to bite into the apple of perdition. Bacchus takes Venus by the hand, the two of them perform a round dance, and the people follow them in long, long columns, casting aside all restraints, to a premature end, like the moths dashing themselves into the flames.

II

OVEREATING

THERE is no doubt that in the old Roman Empire, when wars were so frequent and no one was sure of his personal safety, many thousands must have perished by the sword or lost their lives by some unnatural means. In those times it was not in the natural order of things that people should die at home in their beds, and countless were those whose days were ended by violence. And yet, a sage of that period put the number of those who met an early death on account of overeating and to whom the pleasures of the table proved fatal still higher. For he said: "Plures gula quam gladius homines necat." (More people die through their palate than by the sword.)

Indeed, there can be no question but that overeating, *i.e.,* the introduction of excessive quantities of food into our bodies, is capable of seriously menacing our health and also often of shortening our lives. We may, perhaps, not incorrectly compare our body to an engine, the heating of which is done by food. In consequence of the heat applied to the engine, energy is developed, and through it work of various kinds can be performed.

We may also compare—correctly, to my mind—our body to a kind of a stove, the food then constituting the combustible material, the wood or coal, with which the fire in the stove is maintained. Indeed, combustion takes place in our body just as in a stove, and as in a stove, the fire varies in intensity according to the kind of fuel used. A hot fire or a low one will result, according to the manner in which we feed fuel to our stove.

There exist, as we know, three principal kinds of food material: The protein or albuminous, the fats, and the carbohydrates or starchy foods. Of these three varieties the last two burn the best. And this is only natural. We speak here of kindling a fire, and when we make a fire, we should recollect that we are bringing into life again the rays of sunshine that were beaming down upon the different kinds of inflammable material, *e.g.,* the trees, in prehistoric times, millions of years ago. This is all related to a law of nature, that of the conservation of energy, discovered by Robert Mayer.

No energy is ever lost. It is changed into different forms, but can never be destroyed. Now, the rays of the sun contain large amounts of energy, for the sun is the greatest source of energy in this world; so that in the last analysis all kinds of work on this earth can be referred back to the sun as their origin, a truth enunciated by the great Eng-

lish astronomer, Herschell, already centuries ago. Indeed it can be shown that the fact that our heart beats is likewise due merely to the rays of the sun. The heart is a muscle, and its contractions are performed at the expense of a sugar-like substance, glycogen, manufactured in our bodies from the starchy food, which is converted into glycogen through the processes of digestion.

It has been shown that after the performance work the muscles contain less glycogen. In the last edition of my book "Old Age Deferred," I showed that sugar, and above all, honey, is an excellent remedy for a weak heart precisely on account of the above mentioned principles, the nectar of the flowers, which is the source of the honey, having stored up the energy of the sun's rays. We know that all starchy food and all sugar-like matter in nature can be created only through the help of the rays of the sun—that greatest benefactor of the human race as well as of the animal and vegetable kingdoms.

No wonder, indeed, that this celestial body has been worshipped by the old Persians, the Phenicians, and the Aztecs, as one of their chief gods.

Now, as above mentioned, no form of energy is ever lost in this world, and thus, the energy of the sun's rays, that have been beaming down upon the trees on hot summer days, can be brought to life

again by touching a match to dry wood that has been put into a stove. And lo! Even the rays of the tropical sun that were beaming down millions of years ago upon the trees of the ancient, antediluvian periods, in the lapse of ages are called into existence again, transformed into coal, stones, trees and plants. So also is the kerosene oil which we are burning. All these give back their hidden sunshine to us. It is natural that wood, kerosene, and coal should make excellent fuel, for they are merely a kind of stored up sunshine setting free again the light they received from the sun in prehistoric times.

Similar considerations apply to the fuel in the stove which is represented by our body. Those varieties of food will burn best which are produced through the direct action of the sun's rays, such as the starchy foods. Fat is also easily burned, for it is readily produced in our body upon introduction of large quantities of starchy food and sweets. These substances burn easily, undergo combustion in our bodies, and leave no wastes behind.

Protein food, however, is more complex chemically and will not burn easily, especially if something is lacking, without which no stove will burn, *i.e.,* oxygen. Furthermore, much residuum from the proteins remains, which makes the process of combustion still more difficult. An unfavorable result at the same time is that, if the material with

which the fire is kept burning contains too much protein food, then the other materials such as the starchy food (sugar) and the fats will also burn incompletely. As a result our stove will burn poorly, and much residue will remain.

If too big a fire is made in it and an excessive quantity of food is ingested, a considerable part of it will consist of protein (albuminous food). In general, the protein introduced in our body in the form of meat burns far worse and leaves more residue than the albumin of plants. Among such residues in our stove is uric acid, which is manufactured mainly from meat food, especially from the glandular organs, such as sweetbread, liver, kidneys, etc. Certain kinds of vegetable food, however, are likewise rich in proteins (*e.g.,* peas, beans, lentils, and also coffee beans).[1]

As is well known, uric acid is the source of many disturbances. Blood that contains much uric acid and other wastes does not flow readily and without friction through the vessels, especially the small, narrow capillaries. The viscosity of such blood is, as a rule, augmented and generally at the same time the blood-pressure is higher than normal.

This circumstance, as we know, plays an important part in the production of arteriosclerosis, which

[1] A complete list of articles on food containing uric acid may be found in my book on "Health and Longevity Through Rational Diet."

arises very often from such a cause, and so it is only natural that in gout, which is mainly brought about, on the one hand, through abundant formation of uric acid, and on the other, through insufficiency of the kidneys and their inability to eliminate these noxious substances, high blood-pressure and arteriosclerosis are frequently, if not usually, met with. Gouty subjects often die from the effects of arteriosclerosis.

In judging of the effects of overeating there are two factors which must be considered: First, the quantity of food that is ingested, and, secondly, the composition of the food taken to excess.

When too much food is taken, the stomach and the intestines become overloaded and are thus compelled to work harder, especially if the food has not been previously well masticated and has not been sufficiently exposed to the digestive action of the saliva, which plays an important rôle in the digestion of starchy food. Thus, affections of the stomach or intestines very easily arise which, in their after-effects, may sometimes induce more serious and life-shortening diseases. Imperfectly nourished people, furthermore, are less resistant to the attacks of microbes, and may thus more readily contract infectious diseases.

The risks entailed become still greater if, in the excessive quantity of food ingested, meat is con-

tained in large amounts, and much in the way of spices and condiments are taken into the body at the same time.

As a result, the poisonous substances formed in the intestine bring about disease of the liver and especially of the kidneys, which separate various substances from the blood like a fine sieve, and life may thus be materially shortened. This is further assisted in that these substances exert an injurious action upon the heart and the blood-vessels and greatly promote the development of arteriosclerosis, especially in the presence of other predisposing factors such as syphilis and abuse of tobacco and alcohol. Overeating is capable, in persons suffering from hardening of the vessels of the heart, of bringing about the greatly feared attacks of breast pang or angina pectoris, and thus not infrequently leading to sudden death.

Where meat enters in large amount into the excessive diet taken, serious disturbances of metabolism may result and gout set in; and if, in addition, much sweet or starchy food is contained in the diet, there may appear diabetes, which often ends fatally, or obesity, together with morbid changes in various vitally important organs, such as the heart.

All these disorders develop all the more readily when at the same time the person leads a sedentary mode of life and the combustion of the food sub-

stances is not facilitated by adequate bodily motion as well as a free intake of fresh air. The same is true likewise if the correct proportion between the size of the body and its weight and the required amount of food is not kept, *e.g.*, if a short man of light weight insists upon introducing into his body as much food as would be required for a man of giant stature.

Much depends also upon the age of the person. A youth requires more food to build up his body than an old man or woman who is in process of senile involution. In the latter type of person, unduly rich food is attended with the drawback that in consequence of the largely degenerated and shrunken condition of the digestive glands it cannot be thoroughly elaborated, and from the same cause, also, the noxious and poisonous constituents of the different kinds of food cannot be transformed into innocuous compounds. Then, of course, there may occur in consequence serious changes in the heart and the blood-vessels, which may not infrequently contribute to a fatal issue through arteriosclerosis.

Many a man is quite happy if he can fill himself with large amounts of the choicest foods, but under these conditions punishment on the part of Mother Nature is to be expected. She inflicts such punishment merely in our own interest, in order to give

us a salutary lesson and teach us to mend our ways. To this end she may visit upon such hearty eaters a catarrh of the stomach, with loss of appetite and sometimes vomiting, to get rid of the food that has been gluttonously ingested. Or, there may, in the long run, occur in consequence an attack of gout or podagra, marked by the most excruciating pains throughout the night, as a kind of just punishment for a lack of moderation in the pleasures of the table,

It is a frequent habit with us mortals in the moments of pleasure to quite forget the possible consequences. Some of us, when at a table laden with delicious food, fill our digestive tract to its utmost capacity, until, as the saying goes among the Hungarian gypsies when invited to a wedding dinner, "the food bulges out everywhere." (The gypsies of Hungary remind one in many respects of the colored people of America, *e.g.,* in their easy-going ways and jolly disposition.) For such incorrigible gluttons it would perhaps be advisable to introduce again a certain salutary custom that prevailed in ancient Egypt.

At festival dinners of the highest aristocracy of the kingdom it was the custom for the majordomo to pass around among the guests and present to each a statuette representing a mummy—in which form the Egyptians were preserved after death—

reminding them at the same time with solemn words that while they might profit of the pleasures of the moment, they must not forget that there would surely come a day when they would have to depart for the realm of eternal silence. Surely many of us, hearing such admonitions while sitting at a well-laden table, would be induced to postpone the day of departure as long as possible.

Perhaps an even greater restraining effect might be exercised upon many an incorrigible glutton if there lay upon his board such a weird symbol of evanescence as may be found at the dining table of some of the orders of monks living under the strictest regulations. Thus, while eating their frugal fare, consisting only of vegetables, the Carmelites face a skull of a dead person lying either in the middle or at the head of the table.

It would be against my principles to advocate the general use of such drastic measures, but we must certainly admit that there are some of our fellow men with whom none but such heroic means would avail as deterrents from the full dish and bottle. At any rate, all those who are fond of the pleasures of the table might at least carry out some of the customs of these pious fathers, *viz.*, they might introduce among their numerous fat days at least one lean day in the week, say the Friday of each week.

Especially the great meat eaters would do very well, indeed, to abstain once a week from their habit, which is most harmful to all who are in some degree predisposed to arteriosclerosis, diabetes, gout, or kidney disease—as I have repeatedly pointed out in my books on old age and diet and in a series of monographs on diabetes.

Before concluding this sermon on moderation in the pleasures of the table, I would like to point out that overeating, in addition to the harmful consequences above mentioned, has still another great disadvantage. It leads one into the temptation to drink and smoke after the meal, for there is nothing that a full stomach desires so much as alcohol and tobacco.

It may also be added that overeating often leads to early ageing, for it creates obesity, which also makes people look older, especially when a large abdomen is developed.

Early ageing is also promoted through the fact that overeating exposes to arteriosclerosis. The red face with dilated blood-vessels which heavy eaters often present rather frequently suggests a much greater age than is really the case, particularly if a large abdominal development coexists.

III

TOBACCO

WHEN a man is an inveterate smoker, his passion for tobacco may obtain sometimes such a hold upon him that it would seem nearly impossible for him to deliver himself from its nefarious influence. This accounts for the fact that when, several centuries ago, the smoking habit was prohibited with heavy punishment and fines, it was found impossible to put a stop to its propagation.

Neither the most severe castigations of the church, nor the legal punishment of years of prison and bodily chastisement, nor even the penalty of death that was inflicted upon smokers in the first years after the introduction of tobacco from America to Europe, were able to deter the ancestors of present-day smokers. They persisted in the habit, and if unable to smoke in public, continued to do so secretly.

It would appear that, at least in the central parts of Europe, the martyr smokers of the sixteenth century have worthy successors, for on a winter journey to Italy and France last year I saw on the way through Austria and Germany a number of people standing for an hour or more in the cold

wind and rain in front of the tobacco shops merely in order to obtain a few cigarettes or a handful of tobacco, sometimes consisting simply of beech leaves.

I fear that in the face of such an overpowering habit my admonitions will not be of great avail, and am far from hopeful of complete success, but I would be glad even of the partial success if this lenten sermon were to induce inveterate smokers to a certain degree of moderation, especially in the use of strong tobacco.

It would certainly be going too far to pretend that smoking is harmful to every one, for I know personally of instances of old men in the seventies and even in the eighties, who had been smoking several rather heavy cigars each day for years, and were nevertheless in good health. I have known of the case of a gentleman one hundred years old who was a heavy smoker.

But while smoking even to a rather pronounced degree causes no *apparent* harm in many persons, there are, on the other hand, not a few persons who suffer injury to their health even from the smoking of small amounts of even light tobacco and whose lives may be considerably shortened by daily smoking. Too often this is, unfortunately, recognized only at a late period, when the symptoms of a dangerous disease, the occurrence and development

of which may be very closely related to smoking, *viz.*, arteriosclerosis, are already plainly present.

Tobacco exerts a very harmful influence upon the condition of the blood-vessels, both in animals—according to a series of investigations in them—and in man. Perhaps even more than alcohol, it is, next to syphilis, the most frequent cause of arteriosclerosis. The most serious type of this condition, that which involves hardening of the coronary arteries supplying blood to the heart muscle, and which results so exceedingly often in sudden, premature death, is commonest among heavy smokers, particularly if syphilis has previously been present.

In this connection I would like to mention the fact that there are people who, when asked, will admit that ten or twenty years before they had an insignificant lesion, small scratch, or erosion on their organ, but that as nothing further happened they paid no attention to it. Naturally such persons are dumfounded upon learning from the result of the Wassermann blood test that the insignificant sore they had had so many years before meant that they had acquired syphilis.

It is a strange and tragic fact that as a rule it is precisely these light cases, in which syphilis in its earlier stages has led to no manifestations whatever, that are in many instances the ones most to be feared, for they seem to be predestined to de-

velop the most fatal consequences of syphilis, *viz.*, the serious degenerative changes in the blood-vessels and such terrible diseases of the nervous system and brain as locomotor ataxia and general paralysis of the insane.

Not only the blood-vessels, but even the heart itself, may be harmed by heavy smoking continued for many years, especially if strong tobacco has been used.

Manifestly, there is no sense in delaying a warning to these people against the use of tobacco until it is already too late and they can no longer be saved. Why postpone examination of the heart and blood-vessels until they are suffering from the most characteristic symptoms of advanced arteriosclerosis, together with those ominous attacks of cardiac oppression or angina pectoris? There can be no doubt but that these attacks of angina pectoris—these most dreaded manifestations of arteriosclerosis—very often appear as the heralds of approaching death. In this I refer, of course, to the attacks of true angina pectoris and not the attacks of pseudo angina which nervous persons sometimes complain of.

Now, what I would suggest to prevent the insidious development of these deplorable cases is that every man before he begins to smoke should be examined by a physician to ascertain whether he is fit

to smoke and whether there is anything in the condition of his heart or blood-vessels which would contraindicate his doing so. All persons descendant from families in which disease of the blood-vessels has frequently appeared should be considered unfit. Such persons should likewise be considered unfit for smoking in whom there are found, in addition, irregularities of heart-action, which not infrequently appear rather early in life in the descendants of such families, *e.g.,* irregular pulse, intermittences, a very low or very high pulse rate, etc. Persons thus predisposed to arteriosclerosis can often be recognized from their external appearance.

Especial caution as regards smoking is necessary where there is a history of syphilitic infection, for the germs of syphilis, the spirochetes, establish themselves by preference in the blood-vessels and there exert their devastating influence. If with this are combined smoking and also the consumption of large amounts of spirituous liquor, arteriosclerosis may often set in quite early in life; at least, such individuals are certain candidates for this disease.

Where active mental labor is performed in conjunction with immoderate smoking, there is a marked tendency, according to my observations, to the production of arteriosclerosis of the brain. With this comes the danger of apoplectic attacks, especially if the mode of life is imprudent in

other respects, if inveterate constipation exists, etc. Thus, as I have had occasion to observe, the sleeplessness, dizziness, headache, and failure of memory complained of by heavy smokers engaged in hard mental labor are exceedingly often related to a beginning arteriosclerosis of the brain, of which they constitute the initial symptoms. This influence of immoderate smoking in conjunction with hard mental labor upon the state of the circulation in the brain vessels may be held to account for the fact that, as I was able personally to ascertain, many instances of previous heavy smoking are to be found among patients suffering from progressive paralysis. Aside from alcohol, immoderate smoking thus plays a very important rôle in this terrible sequel of syphilis, which generally brings life to a fearsome ending within a few years.

Thus the habit of smoking, if followed to excess for years, strong cigars and innumerable cigarettes being used up to the very end, smoking indulged in on an empty stomach before breakfast, or short pipes employed—all conditions which distinctly enhance the dangers of heavy smoking—is capable in some persons of promoting the development of mental disorders.

Nevertheless it cannot be denied that smoking under certain conditions exerts a quieting, soothing effect on the nervous system, especially during ex-

citement, and thus greatly facilitates mental work, so that, *e.g.*, many office workers, if deprived of cigars or cigarettes, are not able to carry on their labors as easily. In spite of this fact, it is advisable to exercise great caution before declaring a neurasthenic qualified to smoke, especially among the descendants of families in which nervous or mental disturbances are the rule.

Particularly unfit to smoke are the children, upon whose delicate organism tobacco exerts an especially harmful effect, even greatly impeding bodily growth and development. This applies no less to their mental than to their physical development. In this connection the observations of the Dutch clinician, Professor Pel,[2] are highly instructive. There should be a general legal prohibition against the selling or giving of tobacco to children.

The habit of smoking acts even more injuriously upon the delicate organisms of young girls than it does on boys, and yet, unfortunately, one may now observe this harmful habit gaining ground, doubtless as one of the numerous unpleasant results of the late war. Smoking by women and even young girls must be considered from a far different standpoint than smoking by men, for not only is the female organism by virtue of its much more frail structure and its more delicate tissues much less able

[2] Pel: Berlin. klin. Wochenschrift, 1911.

to resist the poisonous action of tobacco than that of man, and thus, like many a delicate flower, apt to fade and wither more quickly in consequence, but the fecundity of woman is greatly impaired by it, as tobacco exerts a very pernicious influence on the various ductless glands, including the thyroid gland and the sex glands. In view of the large number of men lost in the late fearful war, the authorities cannot be expected to look on unmoved while a generation of sterile women, rendered incapable of fulfilling their sublime function of motherhood, is being produced on account of the immoderate smoking of foolish young girls.

If, in addition, such girls and women who are smokers remain for long periods, *e.g.*, entire afternoons, as is now often the case, in restaurants filled with tobacco smoke, the injury to health induced by the smoking *per se* may be further increased.

Air laden with tobacco smoke in confined spaces is capable of exerting a very harmful effect on human beings if they breathe it for any length of time. Such an atmosphere, indeed, contains not inconsiderable amounts of carbon monoxide and may therefore have a definitely harmful action.

This applies not only to man, but also to animals. Thus, the Dutch investigator, Fokker,[3] found that if animals are kept in such an atmosphere for merely

[3] Fokker: Nederlandsche Tijdschrift voor Geneeskunde, 35, 1884.

one hour, demonstrable amounts of carbon monoxide may be found in their blood. This is doubtless in some degree related to the rather frequent cases in which persons who have been sitting for a long time gambling in crowded coffee-houses, thickly filled with smoke and overheated in addition, suddenly collapse and die. The marked excitement occasioned by the game itself, acting upon a heart originally much weakened, doubtless also plays an important rôle in such instances.

Among professional gamblers such sudden deaths are not uncommon, for in this deplorable and irregular occupation frequent and violent mental emotions are unavoidable. These, in turn, exert a most unfavorable influence upon the heart muscle and the circulation in general. At the same time, staying for long periods in rooms full of smoke, overheated, and often lacking the necessary amount of oxygen may likewise contribute toward a fatal issue.

IV

SEXUAL INDISCRETION

WHEN this universe was created, its Creator paid special attention to all things that would ensure conservation of the lives of mankind and of the lower animals. This is plainly shown by the fact that he implanted in the breast of every creature two instincts which dominate it in an overwhelming and irresistible manner, holding it, as it were, in fetters of iron, *viz.*, hunger and the sexual impulse.

Of these two instincts the latter would appear to be the more powerful. For a watch dog, if he is a dutiful animal, will perhaps reject a most delicious morsel of food and not allow himself to be tempted by it. But a sexual temptation is certain to prove too much for him and lead him completely to disregard his duties to his master.

From this example we see how this instinct triumphs over the other and how sexual attraction dominates that of the palate. It is really a species of bait which nature offers to man and animals in order to induce them to procreate.

In this we are afforded a splendid opportunity to admire the great sagacity and admirable fore-

sight with which nature furthers her ends. Satisfaction of the sexual appetite being connected with great pleasure, the bait thus offered may lead to an immoderation which, in its further consequences, might perhaps even endanger the existence of the whole of mankind.

It seems, however, that nature especially favors mankind, and that the conservation of the human race is the object of special care and preoccupation on her part for all that is connected with it. For instance, the structure of the sexual organs themselves is ordered with such foresight and wisdom that it cannot but provoke the admiration of the most impious materialist.

Nature has found ways and means to impose moderation in sexual activity. While she dispenses pleasure with one hand, she knows also how to punish with the other. Through punishment of the immoderate, the disobedient, and the imprudent, she seeks to warn and admonish others. Thus, immoderate activity in this direction often entails great dangers to bodily health. It is capable of leading in women to very serious disturbances of the sexual organs, with consequences highly prejudicial to their fertility and longevity. In fact it often shortens their lives. In men, likewise, such immoderation may produce serious changes in the nervous system, and also, in consequence of the

close relationship between the nervous system and circulatory apparatus, the early appearance of arteriosclerosis.

Through frequent sexual intercourse, especially in the case of single men, certain infectious diseases, such as gonorrhea, are easily acquired. In such instances, nature may impose moderation through the after effects to which gonorrhea sometimes leads. For not infrequently the chronic gonorrheal inflammation of the posterior portion of the urethra, especially when the prostate gland is involved, leads to a more or less pronounced impotence. This occurs more easily in nervous persons, especially such who had been addicted to self-abuse in their younger years, or, it may occur as a species of punishment in those who have been committing sexual excesses through a considerable period of time.

It should be noted that all kinds of sexual irritations are likely to produce a hyperemic condition of the urethra and prostate gland, and favor diseased conditions of these structures.

Impotence may thus be the result of chronic inflammation, of undue irritation, of infection, and of abuses of the reproductive organs. If, then, many a roué, in his distress over his sexual weakness, which keeps him from enjoying the sexual pleasures that allure him, rebels against God and

nature, we have in such an event one reason more to admire the foresight and wisdom of nature, whereby, while punishing the reckless and the immoderate, she warns others and thus prevents deterioration and extermination of the human species.

For this purpose nature employs still more formidable deterrents to immoderate and indiscriminate sexual activity. While offering with one hand a cup of joy in the shape of sexual pleasure, she holds in the other a cup of poison in exchange for the pleasures enjoyed. She strikes the victim with a terrible disease, consequent upon sexual infection, which leads to the most excruciating, cutting, boring, and fearfully torturing pains, probably the most severe of all diseases to which human beings are exposed, *viz.,* tabes dorsalis or locomotor ataxia.

This is a sequel of syphilis, and considering the fearful pains it produces, there is scarcely any other disease to be compared with it. To this day I retain vividly in memory the fearful cries I heard, as a boy of six years, coming from a neighboring house, where such a tabetic patient was writhing on his sickbed with the most torturing kind of pains.

That which renders syphilis such a terrible disease, moreover, is not merely the severe bodily pains it may provoke in its aftermath, as in tabes, but also the fact, which is still worse, that it may lead to insanity. That to which syphilis may lead

can best be realized when one has had the opportunity to see a paretic patient wallowing like an animal in his own dejecta. It seems a tragic fate for man that the same agency which is capable of granting him the highest degree of enjoyment should at the same time lead him to perdition and be the source of the severest tortures and of destruction of his body and mind.

Happily only a comparatively small number of syphilitics fall victims to such an unfortunate fate—especially those amongst them who for years have been leading a life of dissipation, irregular habits and debauch, and who at the same time have been addicted to alcohol and strong tobacco.

But not even all of the remainder get off easily.

Certain examinations by P. Schrumpf[4] at the Polyclinic in Berlin showed that about 10 per cent. of all the patients who lay there with different kinds of internal diseases owed their malady to syphilis, which they had contracted some time before. Strange to note, a considerable number of these patients had no idea that they had had syphilis.

According to the statistics of the different life insurance companies, there is scarcely any other disease that shortens life so frequently in persons of middle or elderly age as syphilis. Either by its direct consequences or indirectly, syphilis frequently

[4] P. Schrumpf: Berlin. klin. Wochenschrift, 1918.

leads to premature death. Therefore insurance companies with reason demand, as a rule, a higher premium from such persons, as their chances as regards longevity are considerably impaired.

The disorder is ascribed to the small animalculæ, the spirochetes, which establish themselves by preference in the smallest blood-vessels and spread along the vessels to all the tissues of the body, gaining a foothold therein. With the enormous magnification afforded by the ultramicroscope, these diminutive beasts of prey can be seen to at once attack the blood cells and destroy them.

Or, perhaps, the blame may in many cases be placed on excessive doses of powerfully acting drugs, introduced in repeated and prolonged courses of treatment, as though to drive out the devil with Beelzebub.

At all events, the general system in such persons does not have the same resisting power against various infections as that of other individuals, and it is not surprising that, as a result, premature death takes place in the former, frequently even from diseases not of such nature as to threaten life, and which would have been easily withstood by others.

Thus, whoever has once contracted syphilis often continues to have reminders of it throughout life, although fortunately, the severe, life-shortening se-

quelæ can be guarded against by the early use of specific remedies in the very first stage of the disease, before the whole of the body has been contaminated—and also occasionally in the later stages.

The majority who are not completely cured, however, are in many instances exposed to premature death. Very often this takes place in an insidious, obscure manner, without any previous prolonged confinement to bed. How often one hears of an apparently healthy man of forty-eight or fifty years suddenly sinking to the floor while in the midst of a social gathering, and dying immediately after. Such cases are nearly always instances of sudden death the result of arteriosclerosis, the commonest sequel of syphilis among the internal disorders to which it gives rise.

Sudden death in this particular manner may occur all the more unexpectedly in that many persons are completely ignorant of the fact that they are infected with syphilis or have ever been through the disease. Indeed, syphilis not infrequently continues on its course for a long period, even years, without any apparent manifestation of disease, or with only slight disturbances, which are often overlooked.

What makes syphilis so exceedingly serious in its consequences is the fact that it is capable of reacting harmfully on subsequent generations. The

sins of the parents are thus very often visited, as stated in Holy Writ, upon the offspring even unto the seventh generation. Syphilis has not infrequently played at least a partial role in the premature extinction of many a proud and powerful princely house with the last male heir, and thus exerts its influence, no less than does alcohol, in the great realm of world history. Thus a victorious general may have contracted syphilis in the sixteenth or seventeenth century, or a captain of finance in the eighteenth or nineteenth century, and one hundred, two hundred, or more years later there may be born in the glorious lineage of the general or in the fabulously wealthy family of the financial magnate an idiotic, deaf and dumb, or otherwise defective child, or one who, while apparently having normal eyes, is unable to see out of them.

Or, again, some form of a freak or cripple may see the light of day as a silent accuser of the faults of his ancestors. These fatal hereditary influences may become further aggravated through incest and marriage among relatives. "You can't expect to see a rose grow from a repulsive onion or a hyacinth from a gray horseradish," as the ancient Greek poet, Theognis of Megara, correctly remarked.

How often it happens that in such families children are born who are excessively nervous, and very

easily excited and irritated. Diseases of the mind and nervous system, metabolic disorders like diabetes, gout, obesity, etc., and likewise tuberculosis, frequently occur in these families and play havoc in them through centuries of time. If, then, many an offspring of a highly aristocratic or formerly opulent family is found dying in a lunatic asylum or poorhouse, or mayhap even in prison—lunacy and crime are closely connected—he may lay the blame for it on one of his ancestors who met with misfortune in one of his love adventures or drank heavily.

Now, it is only natural and altogether human that, when we mortals meet with hard luck, we should at once begin to rail at the cruelties of nature even though all our misfortune and bad luck is due rather to ourselves. Nature is not the culprit, nature has not been cruel, but we have been cruel to ourselves and to our descendants, transmitting disease to them as a curse for centuries.

We are obliged to answer for all our deeds and actions, not only in what we do to ourselves, but also to those whom we bring into this world, those who are blood from our blood and flesh from our flesh. All our good and bad deeds are passed down to them as a kind of fatal inheritance.

Poor, deluded human being, that plunges headlong into ruin in his intoxication of the senses, like

the moth into the scorching flame of light! Little does he reck, in his sensual intoxication, that he is pushing over the precipice not only himself, but also his unfortunate descendants, and that there will remain, as his legacy to the world and as mute evidence of his excesses and his love of Venus and Bacchus, a series of cripples, lunatics, beggars, and criminals!

At the moment he sees only the joys of rapture, with its arms alluringly outstretched towards him. But many years later, when the pains of body and mind torment him and when his innocent children are dying at a tender age, then he and all his companions in fate clench their fists toward heaven, and charge God, bountiful nature, and the entire creation with being the source of his self-inflicted misfortune.

Our own, human short-sightedness is evidenced in that we only notice the misfortune which lies immediately before us, and are unable to grasp the fact that all misfortune and all evil in the world is merely the legitimate end-result, as it were, of a long chain of evil or imprudent deeds and actions committed a long time, even centuries, before by us or those of our own flesh and blood whose unfortunate heirs we happen to be.

There is no need to hold all-provident nature responsible for all these things.

Life Shortening Habits

I am among those who are entirely convinced that this world has been created with the greatest possible wisdom and that everything in it is disposed with the utmost care and foresight, as any one can readily see by looking through a microscope into the intimate structure of any of our tissues, such as those of the inner parts of the eye. One sees there, as in a kind of kaleidoscope, wonders untold passing before his eyes—such masterpieces as even the most gifted artists, including even the great masters of the Renaissance, Leonardo da Vinci, Michael Angelo, Raphael, or Titian, would be unable to contrive.

At the first sight, many things that happen in nature seem unintelligible and at times repulsive to us. Sometimes we are even tempted to accuse nature of injustice or actual cruelty. But if we take the trouble to obtain a better insight into the doings and actions of nature, and search for the real reason for many features and peculiarities, and the different manifestations of nature's activity that at first seem strange to us, we then find at the bottom of it all the highest degree of wisdom, harmony, and justice. We mortals may err, but those who know how to read in the book of nature, and who are able to understand the language in which she is speaking to us, know best that nature never errs.

Nature speaks to us in the sounds made by animals, in the buzzing of the insects, the singing of the birds, and the colors and odors of the flowers. She speaks to us through the instincts which govern all our thoughts and actions in a greater or less degree. She speaks to us also through the pains she sends us, which are the warning symptoms of many diseases of the body or mind.

If we disregard her warnings, she brings upon us severe punishments, in the form of diseases which are really naught else but manifestations of her love to her children. I have shown in my book, "Old Age Deferred," that diseases are, in fact, merely the expression of efforts on the part of our body to cure itself and defend itself against poisons or microbes of different kinds, which are removed or destroyed by the disease manifestations, such as fever, sweating, vomiting, eruptions, etc. Through the distressing diseases nature inflicts as well as through the disgraceful end to which many a sensuous man comes after contracting the terrible disorders to which sexual infection leads, thousands of the unwary are warned and guarded from a similar fate.

Let us specify, however, what we mean by sexual excess. I do not call a man a voluptuary—and, indeed, as a physician, I would have even the less right to do so—when the sexual instinct gets

the upper hand over him and he seeks to satisfy his craving. I am not a clergyman, and as a physician I have neither the right nor the wish nor spirit—anything hypocritical is most abhorrent to me—to cast stones at him. By voluptuousness I mean exaggeration in this direction, as exemplified in men like Don Juan, the hero of the famous opera of the immortal Mozart.

His real name was Don Miguel Manara Vicentello de Leca. He belonged to the aristocracy of Spain, and was endowed by nature with all the gifts that seduce the soul and body of woman. He had great wealth and an eminently attractive exterior, and was a regular dare-devil, having no fear nor scruple in obtaining his ends, *viz.,* the enticement and seduction of women. Yet, not satisfied with having triumphed over their virtue and afterwards abandoned them, he even killed their relatives when they tried to secure reparation by force of arms in defending the honor of their families.

After he had led this life of debauchery and volupty for a long time, repentance came upon him. He obtained an insight into the futility, evanescence, and emptiness of all these worldly pleasures, and in this repentant mood—and let us hope that he was driven to it solely by ethical and religious considerations and not by physical necessity—he

entrusted to a famous painter, Valdes Leal, the task of expressing his thoughts in a painting.

Valdes Leal created a masterpiece.

If you have read the celebrated works of Washington Irving and ever visited that earthly paradise, Andalusia, and in its heart, beautiful Sevilla, you may go to the Hospedal de la Caridad there and see this picture, which one of the nuns will show you.

But look at it only if you are a man and your nerves can stand it, and do not look at it—for heaven's sake—if you are a woman! For tender woman, I think, should be as far as possible spared such terrible sights. The average woman should see only the sunny side of our life, and not the side in which shade and darkness prevail.

When the nun removes the veil from the picture one starts back in horror. One sees there the bodies—indeed mainly the heads—of two persons, in a state of complete decay and putrefaction, and so natural is the sight that, as the famous painter, Murillo, remarked, one feels tempted to put his fingers to his nose to exclude the horrible odor exhaled from the putrefying remains. Innumerable worms are swarming in the putrescent flesh, crawling out from all its pores. In the background is to be seen a heap of skulls, and above the picture is the inscription: *Finis gloriæ mundi.*

These two bodies, covered with a magnificent cloth as far as the head, had belonged, while in life, to the mightiest men of the earth. The one was a ruler of the things of this world, the other a ruler of the things of the world to come; the one, a commander of the bodies, the other, of the souls; the one, reigning over things material, the other, over things spiritual. The one was a king, the other, a bishop.

But only when they were living.

For after their death, in putrefaction their bodies looked exactly the same, and were just as much devoured by the worms, as that of the least beggar or outcast could have been. Worms feed on kings and beggars alike. *Finis gloriæ mundi!*

Reference is here made to this horrible picture merely to present another instance of the admirable foresight shown by nature in all her actions.

Putrefaction may be a horrible sight to our eyes and offensive to our nostrils, and yet it is these putrescent matters that are likely to produce the choicest scents and the finest aromas in flowers and fruits, for which they constitute the best fertilizers.

Indeed, putrefaction is the necessary condition for the creation of new life; for, as a much quoted dramatic proverb says: "New life arises from the ruins." Death and putrefaction precede the creation of new life. Through putrefaction the dif-

ferent particles, molecules, and atoms of which each body is composed are set free, their liquid as well as their solid parts pass into the soil and are there taken up by the plants and enter into their structure, and when these are eaten by animals, may become flesh again. A constant circulation of these matters thus takes place, life being, indeed, naught other than the continuous transformation and migration of different substances, which disappear and later come to life again.

If the rich of this earth, not satisfied with the immortality of their souls taught by religion, should like also to insure the perpetuation of the substances of which their bodies are composed, they should prefer to be buried in the soil like the poor instead of enclosing their bodies in sarcophagi or having them cremated, thus consigning them to eternal annihilation!

After this long digression from the subject of sexual indiscretion to that of putrefaction, there may be a few who will think that these two subjects are not entirely foreign to one another.

But let us return to our original subject.

Voluptuousness is, as above explained, an exaggeration of the instinct planted by nature in the breast of every creature—man, animals and even plants—to procreate its kind. This instinct craves satisfaction, but the latter should be permitted only

within reasonable, *i.e.*, physiological, limits, as is more fully specified in the chapters on sexual life and its abnormalities, in my book, "Old Age Deferred."

While nature has implanted in man this desire which is frequently the cause of his ruin, she has also, by imparting to him a higher degree of reasoning power, placed in his hands the means of moderating it and keeping it within bounds. Since, however, human prudence is incapable of getting the better of sexual desire and pruriency, she has brought into play an influence which had been in existence a very long time before—even before the human race made its appearance on the earth.

As the Holy Writ teaches, in harmony with findings of exact science, man was created only after the animals had already been in existence. Among the latter were a number of species, *e.g.*, many kinds of birds, that lived in strict marital relationship, with but one female to each male, that is, in a state of monogamy. Even now the stork may serve to many human beings as a model example of the good husband.

As it is not possible, however, for every human being to enter into matrimony, and while not every one can muster the will power to control this form of desire, he may at least remove with some degree of security the serious risks attending gratification

by observing cleanliness—a measure of which nature, in her living creations, affords a number of instructive examples, and which has been originally instilled by her into every animal.

Even the hog is a cleanly animal. It would certainly not wallow in the mud if it had clean water at its disposal for its daily bath. It is just as fond of its daily bath as the ladies and gentlemen of high estate, and when clean water is not supplied to it for the purpose, even puts up with the dirty water.

Now a very simple, and very often effective, measure against venereal infection is thorough local cleansing immediately after sexual congress, especially if the cleansing is carried out with antiseptic agents such as potassium permanganate, or better, as concerns syphilis, with a weak solution of corrosive sublimate.

During the late world war, as regimental surgeon, I had under observation many thousands of artillerymen, and in spite of the fact that they were vigorous young men, it was only very rarely that I encountered a single case of syphilitic infection, as they were most strongly admonished to employ the precautionary measure above referred to. When a case of disease came under observation, it was, as a rule, accounted for by inattention to the instructions given as to cleanliness.

V

UNCLEANLINESS

IN the third year of the late war I was ordered by my superiors to take measures to check an epidemic of typhoid fever that had broken out in Uzsok, in the Carpathians, the scene of the great battle between the Russian and Austro-Hungarian forces. The task that lay before me was to prevent the spread of the infection by all means at my disposal. With this end in view I gave to all the troops under my command as sanitary officer strict orders that each man should wash his hands thoroughly before and after each meal. This order was based upon the fact that, as proved by the researches of bacteriologists, the germs that give rise to typhoid and certain other infectious diseases, such as cholera and dysentery, contaminate the hands and are conveyed by them to the mouth and digestive tract, thus bringing on the diseases mentioned.

Ages ago, thousands of years before science had proved with the aid of the microscope the existence of microbes that carry infection by direct contact, there were great, wise men, such as Moses and Mohammed, who had a kind of presentiment of the

existence of such noxious germs, and who seem with prophetic vision to have suspected that probably all infections took place through such agencies.

At least, the Old Testament mentions a fact which permits us to suppose that the great prophet of the Israelitic faith, who is also revered by the Mohammedan creed as one of their saints, *viz.*, Moses, suspected the connection between direct contact and subsequent infection. He issued the order that the dejecta of each person should be buried outside the camp, and that in case an epidemic broke out in one place, nobody from that place should be allowed to visit another camp. He also gave instructions as regards the frequent cleansing of the body through the ritual ablutions. Like so many others of the best teachings of Moses and of Jesus Christ, Mohammed took these over into the creed founded by him and even improved upon them by commanding the faithful to carry out a whole series of ablutions each day. I remember having seen among the attendants of the Shah of Persia, Muzaffer Eddin, whom I treated in 1902 in Carlsbad and rather often accompanied on his walks, a man who always carried with him a silver receptacle filled with water and a clean towel. Each time the Shah partook of any food on the way or left off his journey for any other purpose this man stepped forward and the Shah washed his hands.

Aside from the infectious diseases already mentioned, many others may be transmitted with the dirt on the hands and lead to premature death.

Many persons have the habit, beneficial for the circulation of blood in the nose but repulsive from the esthetic standpoint, of digging around in their noses with their fingers. A small wound or abrasion at the nasal orifice may readily be produced in this way. Now if the germ of erysipelas is present on the soiled fingers this disease may become established. In the face such an occurrence is especially serious by reason of the fact that the infection may extend to the scalp and this, in turn, lead to an almost invariably fatal inflammation of the brain membranes through passage of the agent of the inflammation through the scalp and the bony plate covering the brain.

Some years ago one of my colleagues in Carlsbad scratched open a small incised boil on his neck. Erysipelas set in, and subsequently meningitis, and the victim succumbed, though in the prime of life.

While erysipelas, fortunately, does not always result from such practices, yet the scratching of the skin with soiled hands on account of itching very often gives rise to troublesome furuncles or inflammation of the cellular tissues, and indeed, not very rarely to pyemia or septic poisoning, with fatal termination. My own mother's life, unfortunately,

was lost in this very way; she died when only fifty-three years of age.

From all this we see how absolutely necessary it is to keep one's hands always clean and wash them frequently during the day. When I was in charge of a section of the military hospital at Ungvár, Upper Hungary, in 1916, many soldiers came for treatment on account of boils, cellulitis, and open sores. Where large numbers of vigorous young men are quartered in old buildings which have previously been used by others for hospital purposes it often happens that they are attacked by blood-sucking insects such as fleas and bedbugs. The violent itching that results leads to much scratching, and on account of the dirty hands collections of pus in the tissues of the skin and the underlying cellular tissues are formed. I gave orders that all such soldiers as were found in the clinic or at the frequent daily examinations with dirty hands or feet should be reported for punishment. The result was that after that fresh boils or abscesses were reduced to a very low number.

Every person should be taught the need of habitually keeping his hands clean, from childhood on. As I personally observed, in the educational institution for children in Milan, conducted according to the teachings of Dr. Montessori, each child takes daily turns in washing the hands of the other chil-

dren, thus becoming all the more accustomed to frequent washing of his own hands.

Frequent washing of the feet, at least once a day, is also to be regarded as necessary. Where it is not practicable for every person to take a full bath each day, he should at least bathe his feet immediately after rising or before going to bed. If there is not enough hot water at his disposal for the purpose, he should at any rate rub them down with a wet towel. In the Orient, washing of the feet has been practised from the earliest times, as we may read in the Scriptures, which describe how a foot bath is offered the first thing to every newly arrived guest.

Among the ancient Egyptians it was likewise the custom to have the feet of every guest washed before beginning a meal. Even though this was very appropriate in view of the habit prevailing in those times of going bare-footed or wearing sandals, it seems really all the more necessary now because of the fact that on account of wearing socks and air-tight leather footgear all the greater opportunity is given for the accumulation of dirt, and proper airing of the feet, which are abundantly supplied with sweat glands and sebaceous glands, is rendered impossible.

Nature herself actually teaches man cleanliness in the examples of it afforded in the lower animals.

Thus, we note how the cat licks her coat and carefully cleans the coats of her young almost daily. This form of self-cleansing of the body may be observed in many species of animals. Even flies, which often seek their food in most disgusting filth, take care to cleanse their feet, with which they may do much harm, even to human beings, in the hygienic sense.

For the benefit of people who keep their houses in an unclean condition, I might mention by way of contrast the birds, which, like the swallows, carefully remove all dirt from their nests, and many species of birds that have shallow nests even teach their young to eliminate their excreta to the exterior.

Uncleanly persons may learn a very great deal from the bees. Bees tolerate no dirt in their habitations and carry all forms of excreta, moulds, and dead bees outside of the hive.

Before the bees take up a new dwelling place, the first thing they do is to clean it thoroughly and free it of all dirt and dust. To all those persons who never air their living rooms and are always breathing the corrupted air in them, thus exposing themselves to life-shortening diseases due to bacteria, such as tuberculosis, the bees also afford a wholesome example. In every hive certain bees are charged with the duty of securing ventilation, which

they do by executing fanning movements with their wings, often continuously for as long as twenty-five minutes, in order to keep the air fresh and prevent its becoming overheated. Among the bumble bees, again, a worker stands at one of the ventilating openings in the roof of the nest first thing in the morning and fans out the foul air that has accumulated in the structure overnight. The bees and bumble bees have an even more delicate and sensitive olfactory apparatus than man, and this apparatus is more readily offended by foul odors than the organ of smell of many human subjects, which is less sensitive and therefore more tolerant of them.

Keeping the body clean and living in pure, wholesome air is absolutely necessary if we are to avoid exposing ourselves to any of the numerous infectious diseases, the germs of which occur in myriads everywhere over unclean skin or in contaminated air.

How greatly the keeping of the body clean is capable of warding off all manner of infections, even after wounds, was shown by experiences in the late war. It is also related of the Japanese in connection with the Russo-Japanese war that they seldom became infected after wounds because the soldiers were compelled to bathe before every battle and their uniforms were kept clean. Similar reports are made of the Turkish soldiers during the

world war, their wounds healing quickly. In this case, of course, aside from cleanliness, the results were also promoted by the important circumstance that the devout Mussulmans followed the wise direction of their prophet not to take any spirituous liquors. Such liquors, if taken daily or frequently, reduce the intrinsic resisting power of our bodies against infection, a power conferred upon us by beneficent Nature.

VI

AMBITION

IF the average length of human life were at least a hundred years, I could readily understand why so many people work day and night, amidst the greatest privations, with much suffering, groaning and lamenting, merely in order to lay aside a sum sufficient to permit them to enjoy life for a span of years more, free of care and sorrow.

But as things are, alas, human life does not exceed, on the average, three or four score years—three score and ten, as the Holy Scripture says—and so, unhappily, it is given only to a very few, and rarely to those who work the hardest, amid strain and stress, to enjoy their saved-up wealth for a long period.

Indeed, there are so very many who, while on the road to a happy and restful evening of life, fall victims to their duties and vocation long before they reach the harbor they have so long been wishing for.

Entirely given up to their work and vocations, they fail to pay any attention to their health or to the requirements of bodily hygiene. And from personal observation I know that in no country of

the world is this the case to such an extent as among the business men of America.

Thus, it is no wonder that the continuous wear and tear, the overwork and great fatigue without subsequent rest, end their lives at a relatively early age. Many young people working in badly ventilated rooms, for instance, without due attention to the principles relating to a rational and fortifying diet, and never taking walks in the open air to allow of free expansion of their lungs and an adequate supply of oxygen to their system, readily develop tuberculosis.

Many other persons, as soon as they get to be forty years of age or somewhat older, though sometimes even before that time, develop a high blood-pressure and die of arteriosclerosis when only middle aged—a consequence of the never-ending stress to which they have been exposed by the chase after the almighty dollar. To this purpose they have devoted all their thoughts and every minute of their time, working and toiling without reasonable interruptions for rest and repose.

There are hundreds and thousands of American business men who never take the time to enjoy a walk amid the wonders of nature or a rest after the day's toil.

It is not surprising that the entire disregard of the most elementary requirements of hygiene, their

minds being entirely taken up by their ambition to acquire great wealth, sends them to an early grave.

In this we see another instance of the manner in which nature avenges herself when a correct measure in all things is not kept. Even ambition, otherwise rather a pleasant stimulant in our prosaic daily life, and which really makes life worth while for many of us, must be bridled and kept within reasonable bounds. I must admit, however, that to a certain category of men, those specially favored from heaven with extraordinary gifts of the intellect, those who harbor an inward impulse to strive for the highest ideals, such moderation is very hard to observe.

To those whom divine benevolence has granted extraordinary abilities and even genius, it is indeed an impossible task not to consecrate themselves with all their souls and all the energy they are capable of to their vocations and special provinces, their minds being directed incessantly, day and night, to new inventions or problems. And so there must necessarily happen to them rather often what happened to Icarus, of whose tragic fate mythology tells us, when he attempted to fly up in the heavens with his artificial wings. Owing to the heat of the sun's rays as he drew nearer to it, his wings were melted, and he fell and lost his young life.

It is a tragic fact that great geniuses seldom

reach an advanced age. The fate of the great princes of music, Mozart, Beethoven, Schubert, and Chopin, exemplifies this fact.

Precisely the same is true of the great scholars and inventors. I have already directed attention to the frequency with which great scholars and also widely known business men acquire hardening of the blood-vessels of the brain as a result of their continuous mental efforts without subsequent rest and relaxation. Such men suffer apoplectic attacks and often die when comparatively young.

How sad it is, at the same time, that the star of many an inventor and discoverer, unrecognized in life and cheated out of his expectations and hopes, rises only above his grave! His is very often a sad fate. Too often he is exposed to disappointments and deceptions of all kinds, and must fight for his views and convictions against others and combat adverse and erroneous opinions. How often it happens that other investigators try to steal his invention, or claim it to be their own and dispute his priority!

Now if we consider that in many men of a nervous and excitable disposition even merely a lively discussion is apt to cause palpitation of the heart, rise of blood pressure, and sometimes even a temporary arrest of the heart, it is not to be wondered at that in such persons arteriosclerosis and old age

in general may make their appearance early; or even, likewise, disease of the mind, if there should be present a predisposition for it through inheritance or from any other cause.

Among the great pioneers of the physical sciences, Sir Humphrey Davy and Faraday, arteriosclerosis of the brain developed at an early age. Indeed, Sir Humphrey died at the age of fifty-one after an apoplectic attack. Faraday already in the forties showed symptoms of arteriosclerosis of the brain, *viz.,* headaches, cerebral pressure sensations, dizziness, and a considerable loss of memory. So forgetful was he that once, having worked for two weeks on a certain problem, he found out by accident that only a few months before he had already worked out the same thing. He had absolutely forgotten all about it. Neither he nor Sir Humphrey Davy ever knew an hour's rest until they broke down from overwork. Faraday became so forgetful in his fifties that often he could not spell a word correctly.

That such great inventors and discoverers frequently fall victims to a sad fate cannot surprise those who know how impractical they are as regards the questions of every-day life. Often they die in poverty, while others make large fortunes out of the fruits of their brains—the inventions and discoveries they have made.

It seems as if fate herself desired cruelly to persecute those who, with their great minds, find out the important secrets of nature, previously concealed, which they then apply to the benefit of all mankind.

But even mankind, let us hasten to state, is most ungrateful to the great inventors and discoverers, who often sink prematurely to their graves with a broken heart.

I shall here describe the tragic fate of two great pioneers as striking examples of the fate that awaits such great men:

Ignace Philip Semmelweis, a Hungarian born in Budapest in 1811, was the discoverer of the true nature of puerperal sepsis (childbed fever) which until his time carried off yearly many thousands of unfortunate mothers. Until the year 1846 an enormous mortality prevailed in the obstetrical wards of Vienna, the largest in Europe at that time. So great was the mortality that, among the women that lay there in childbed, as many as one out of five, sometimes even one out of three, succumbed. Semmelweis conceived the idea that it must be the doctors and students of the clinic, who also performed the autopsies at the adjacent pathological institute and often examined the women immediately after completion of an autopsy, that were responsible for the infection. A tragic accident which

then happened confirmed him in his conviction. Dr. Kolletschka, Professor of Medical Jurisprudence, was wounded in the finger by a medical student while dissecting, and died after showing exactly the same symptoms as the women with puerperal sepsis. Semmelweis then insisted that before each examination the hands should be washed with chlorine solution. Immediately, the mortality dropped below 1 per cent. When Semmelweis thereupon published his monograph on the infectious origin of puerperal sepsis he was laughed at and attacked from all sides, and in consequence even lost his position at the university. They completely tabooed him. Even Virchow went as far as to say of him, "the fellow is simply speculating!"

It was also due to Virchow, the great pathologist, that the recognition of the antediluvial existence of man was delayed for twenty years. He maintained that the characteristic signs presented by the skulls of prehistoric men were of a pathological nature, and due merely to disease. But when similar skulls were found at points far distant from one another, as in France, Croatia, and Germany, with exactly the same characteristic signs, then this great pathologist had to cease his stubborn resistance and give in.

I believe that if there is anything that will displease God, it must be when those who are on

the highest steps of the ladder look down with contempt upon those who are climbing up under difficulties, and try rather to throw them off than to cheer and assist them.

As a result of the constant attacks upon him and the continual fighting, Semmelweis became mentally affected and had to be placed in a lunatic asylum. He died there fourteen days later, and through the irony of fate he succumbed to exactly the same disease he had been combating all his life, septic fever, in consequence of infection of a small wound on his finger.

The fate of another great discoverer was no better: Robert Mayer, who discovered the natural law of the conservation of energy. He made his first observation on this subject, which rendered his name famous, when a young doctor. On board a ship lying in the harbor of Batavia he had occasion to perform venesection on the arm of a shipmate, and was surprised to find that the blood in the vein was as red as that in the arteries, owing to the influence of the tropical climate. This led him to his great discovery. Publishing his observations and upholding his theories, he was attacked from all sides, and had to fight bitterly for recognition. This had disastrous consequences on his mind, for in an attack of insanity he committed suicide by jumping from a window to the street. "Le risque du mé-

tier," the Frenchman would say, commenting on this tragic fate of inventors and discoverers.

But even if not all inventors and discoverers are as unfortunate as these two men, they all have to put up with the irony and satire of their "grateful" fellowmen. When Galvagni was addressing the Medical Society of Bologna on his discovery of the galvanic current through his memorable experiment with the electrified leg of a frog, his colleagues greeted him with incredulous laughter. He was nicknamed "the frog's dancing master."

Harvey, the discoverer of the circulation of the blood, was received with scorn and derision by his colleagues.

The inventor of the procedure of percussion, Dr. Auenbrugger, of Vienna, was also ridiculed and his invention recognized only forty-two years later, just before his death, the famous French physician, Corvisart, publishing a book on his methods.

So many inventors and discoverers do not live to see the triumph of their discoveries, and not a few of them are driven to an early grave by their disappointments and the subsequent nervous excitements and breakdown! The bitter contest and efforts, the struggle for the recognition of their ideas and theories, consume their vitality and often lead to their acquiring diseases likely to shorten their lives.

The same applies to political rivalry, financial speculation, and gambling on the exchange. Many a financier pays dearly for his first million, as does also the politician who at last attains the high post in the government of his country for which he had been bitterly striving for years. Frequently arteriosclerosis and a weak heart constitute the price which they must pay for their success, and often it does not take long ere we read in the papers a notice that such and such a famous statesman, or prince of finance, or steel magnate or other great business man, has died suddenly of heart failure or an apoplectic stroke. Sometimes they get off rather cheaply if they develop some disturbance of the nervous system, or of general nutrition, or metabolism, which is governed by the nervous system, *e.g.*, diabetes, a disease most frequent amongst captains of finance, successful business men, statesmen, and diplomats.

Now, I raise the question: Should we give up all our ambitions, our striving for high honors, our longing for inventions and discoveries, our hopes for imperishable fame, simply because it may shorten our lives and expose us to protracted diseases? (It is true, however, that only an immoderate, indomitable ambition, great efforts, and fatigue without subsequent rest and recovery, expose us to such dangerous consequences.)

Was it not the royal prince, Gautama Buddha, who taught that the highest aim of man is renunciation, complete annihilation, the "Nirvana," which after all must inevitably come? From this viewpoint, striving after high rank, honors, and distinctions is merely a foolish thing!

Yet even if it is literally true that we mortals are nothing but perambulating heaps of earth consisting of earthy salts and other temporary ingredients, all of which matter soon returns to the earth whence it came—"pulvis es et in pulverem reverteris," says the Holy Scripture—our benevolent Creator has given us an immortal mind which nothing can prevent from soaring to the heavens and performing deeds that move the whole world.

If we followed strictly the teachings of Buddha, the energy and impulse toward higher things existing in many men, the investigation of great problems that are occupying the minds of the educated world, and the ambition for new discoveries and inventions, in fact, all progress in science, would be nipped in the bud.

Indeed, we may observe that in the very countries in which Buddha's religion has been dominant scarcely any inventions or discoveries of such importance as to reach us and match those of Europeans have been made. Furthermore, it may be pointed out that the nations in which Buddhism

has been a ruling factor have not been able to maintain their independence and develop the necessary strength to resist foreign invaders. Thus we see that India, the cradle of Buddhism and the country in which it was the creed of the majority of the population, became a vassal to other nations.

We may harbor admiration for the sublime teachings of the great Buddha, but let us say at once that if we should follow his teachings strictly it would mean the end of all joy in our work and of all our energies and impulses to activity and labor. They constitute an Utopia as compared to the present circumstances of life, and would kill all ambition, in common with the cruder teachings of the Russian fanatics, the Bolshevists. They would mean the end of all individuality.

No, such teachings may suit the inhabitants of the East, but they are certainly not in harmony with the ways of thinking of the western nations and especially of the Anglo-Saxon race, and are quite contrary to their soul and nature. For in looking through the pages of history, we see therein the deeds to which they were impelled by their great ambition. In discoveries and inventions, they are the leaders of the world! And in regard to the capacity for work, America takes the lead. This I know from personal observation, having spent fourteen months in the United States. I have trav-

elled through all of Europe and a part of Africa, but nowhere have I seen so much work done day by day and so indefatigably as in America. Americans are the most industrious workers of all.

In this connection I should like to point out that nature itself compels man to work. And not only man, but even all of the animals. I would even go so far as to say that to work is a kind of *instinct* implanted in man and animals by nature herself. It is a natural consequence of those two great instincts, hunger and sexual desire, which keep him irresistibly under their spell. Even the least and most despised insect is a worker, for he is governed by the same instincts. Man and animals must work to satisfy their hunger. Sexuality impels both the male and female of animals to build their homes, and when they have begotten offspring they must work to provide them with food.

"God slumbers in every animal," says the pious Mohammedan, and therefore it is a great sin against God and nature to kill an animal, even an insect, unless one is compelled to do so. A great purpose in education should be to implant in every human being, even as a child, the great truth that it is a sin to kill an animal, and that through the killing even of a despised insect, in a certain sense there has been destroyed a worker intended by nature for some useful purpose, the importance of which we

often do not, with our limited knowledge, apprehend. Even the lowly housefly, which so often spreads disease, may be useful in consuming all kinds of refuse, and that despised animal, the rat, may be of service, acting as a kind of subterranean scavenger.

Before we kill birds of prey, we should consider the fact that they destroy certain animals, such as field mice, which do harm to agriculture. Let us reflect that the merciful Creator embraces in His love not only ourselves, narrow-minded human beings that we are, but likewise all animals, even the most lowly, though some manifestations in nature would seem to indicate that the Creator showed preference to man above all animals, and favored him in a special way.

According to the holy laws of the old Egyptians, the same punishment after death will await all those who, in their lives, have tortured innocent animals.

Since it is our duty to accept all good teachings, we should also follow strictly one of the wise precepts of Buddha, *viz.,* that we should not do our work simply for the sake of the material reward to be expected from it. To my mind, no man with an idealistic way of thinking, and whose heart is made of flesh and not of stone, does his work and pursues his vocation merely for the money he may get for it. It is certainly a fact that the insatiate

ambition of great geniuses, of inventors, poets, and painters, and of the great masters of music, has not been fostered by the hope of gain and the wish for riches. No, these men were spurred on by an irresistible impulse. It really seems as if nature, or divine providence, used such men as instruments to serve their purposes in the interest of the entire human race. Little do these exceptional mortals care for material rewards, and true genius is never held back by the fact that it so seldom obtains the honors and recognition it deserves.

It is a sad truth that laurel wreaths are wound only about the lifeless skulls of these great men, and that by the irony of fate, others, as a rule, enjoy the fruits of their great inventions and not themselves. This we may note, for instance, in the case of the great Viennese composer and genius, Franz Schubert, whose melodies are known all over the world, alleviating and cheering so many of our despondent moments. He remained a poor man all his life. Scarcely one hundred years had passed after his death when a clever Viennese producer of operettes put together a theatrical piece composed of the different melodies of that immortal composer and made more money with it in one evening than that great man had made in years. About a year or two ago, moreover, one of Schubert's kin died in Vienna of starvation, in direst poverty.

Ambition

The really great men, the great geniuses, do not understand business! Their very nature is contrary to the making of money. There scarcely ever existed one of them who could have accumulated any money. And so it came to be that Mozart was always in straightened circumstances and in debt. At the age of six he sat on the knees of the Empress Maria Theresa in her sumptuous palace at Vienna, and at about thirty-five he was already being consigned to a poor man's grave in the potter's field, followed by only a few friends as mourners. Van Beethoven always found money for his relatives, but was hard pinched to satisfy his own wants.

Poverty seems to be the sad fate of these great men, for nothing is more alien to their nature than greed and avarice.

VII

AVARICE

IN eastern countries it is the custom to consign the bodies of the deceased to earth clothed only in a simple shroud. The latter, of course, has no pockets, and it is a proverb in these countries, when the penuriousness of some persons is being censured, to remark that the shroud has no pockets, meaning by this that when one dies he cannot take any of his riches with him. We may possess millions, we may call the finest jewels and diamonds our own, and we may have found the treasures of Montezuma the Second, which were hidden from Cortez; but when once we are dead, "as dead as a door-nail," as Charles Dickens said of old Scrooge—none of these are any longer of avail to us. All the treasures of Aladdin would then not be worth a farthing. For as the patriarch, Job, said: "Naked have I come from my mother's womb, and naked do I go back to her."

Naked as we go back to our Mother Earth, we can take nothing, literally nothing, with us. And yet we see many a millionaire, and many a Croesus, cling to his riches till he draws his last breath. The fool, as if they could follow him to the king-

dom of eternal darkness! Many a millionaire, who could enjoy all the pleasures of life that money can buy, and who could brighten his days with all possible luxuries and amenities that make life more agreeable and bearable, would yet rather die—being such a miser—than spend a trifling portion of his wealth in the interest of his health or to procure recovery from disease. There are many people who know how to make millions, yet are entirely ignorant as to how to spend them with wisdom. Some, indeed, are quite incapable, out of avarice, of using even a small part of their wealth to satisfy their own wants and bodily needs.

Greed and avarice shorten life. The greedy man tries hard, by all means, often without scruples or regard for the exigencies of his own health, to make money. Very frequently he does so with complete disregard of the interests of his fellowmen, little caring if they are ruined by his enterprises. Evidently he is quite ignorant of the proverb, "Live, and let live," or at least, he pays no attention to it in his pursuit of the shekel.

The miser is still worse! The greedy man fails to heed the interests of others, caring not if they are ruined on his account, but the miser cares not a whit even for his own interests, *i.e.,* the interests of his own health, in his love for riches. He loves money so much that for fear of losing even a small

part of it, he neglects his own wants and even the most stringent requirements of his health and bodily condition. Such is true, unadulterated avarice!

The greedy man desires to make money, much money, by all means, but he also wants to enjoy the money he makes. He does not pinch himself in anything that concerns his own comfort, and often spends money freely for this purpose. But the avaricious man accumulates gold only to hear its clinking sound, which is music to his ears. He wants to hoard his beloved money, and he would rather starve and freeze in the bitterest winter than use a small part of it to buy coal for his own comfort.

Such privations hasten the end of the avaricious. Underfeeding exposes them to certain diseases. Among these diseases tuberculosis takes first place. When the body tissues lack certain mineral substances which are indispensable for their maintenance, such as lime, iron, potash, etc., their resistance to the myriads of microbes, to the attacks of which we are constantly exposed, is diminished. Persons in whose scanty diet these elements are not represented in sufficient quantities are more likely to fall victims to infections of all kinds.

The working power of the heart-muscle is likewise impaired when it fails to receive through the diet the substances necessary for its activity, espe-

cially the sugars. Accordingly, in poorly nourished persons one very frequently finds the heart to be weak, a fact to which I referred in greater detail in the fifth, enlarged edition of my work on "Old Age Deferred."

The miser, in order to save money, has a predilection for living in the most unhealthy sort of a dwelling, if only it be inexpensive, and by thus selecting, out of stinginess, a dark and often damp abode, he is exposed to all kinds of infectious diseases, particularly articular rheumatism, with its damaging after-effects on the heart. When, moreover, the miser falls ill, he fails to consult the physician in good time, when the latter could still be of service to him, but from motives of economy waits until very late, when the disease has already exerted its destructive effects, which can no longer be counteracted, even by the most skilful physician. As a rule, these unfortunate persons would rather die than seek medical help, unless compelled to do so by intolerable pain.

This sort of thing is met with very often among the wealthiest misers. For a number of years I had under my care a multimillionaire patient from a Southern town, who was suffering from diabetes. In order to avoid paying the Carlsbad "cure-tax," amounting to 20 kronen, he lived in a suburb of the city. Out of sheer economy he consulted me

only once each time he began his cure, in spite of the fact that he was suffering seriously from his diabetes. It seemed as if, as a good uncle, out of love for his nephews, he wanted to terminate his life soon, thus helping them to spend with lavish hands the treasure he had been heaping up during his life, and let other people also have something of the riches of their uncle.

Here we see another instance of the compensatory justice that exists in nature, by virtue of which treasure that has been hoarded up without avail to any one rather frequently passes into the hands of heirs who rapidly consign it to its proper destination, *viz.,* to circulate through other hands instead of being locked up without any practical benefit in a strong box. And so it is that, as a kind of punishment, misers not infrequently have spendthrifts as their heirs.

It is certainly an abnormal thing when rich people prefer to expose themselves to disease and premature death rather than part with a small fraction of their fortune. This undoubtedly betrays an abnormal mode of thinking. Now that which is abnormal means something unsound, and such unsoundness can, indeed, be correlated with disease. According to my observations, this condition embraces not only changes in the mind and impairment of the reasoning powers, but also changes in

the body itself. I have rather often observed that wealthy individuals, previously very active mentally, show a decrease of their mental capacities as soon as they begin to age, at the same time becoming very close-fisted and stingy, in marked contrast to their previous liberal habits. I am consequently inclined to regard avarice as a senile manifestation.

It is an interesting fact that in such persons I have invariably found a condition of arteriosclerosis, and in particular a hardening of the vessels of the brain.

I should like to point out here the interesting contrast that exists between the liberality of youth and the stinginess of old age. In youth there is active circulation of blood through the vessels and the cortex of the brain. The seat and center of all our mental faculties is thus well provided with blood. As a rule, under these conditions, liberality is to be noted.

In old age, however, the circulation of the blood is slowed down, changes occur in the tissues of the blood-vessels, which become narrower, and the tissues supplied by them are poorly and scantily nourished. Atrophy of these tissues occurs in consequence. It may be that the penuriousness we so often find in such old people is related to this process of atrophy.

Indeed, I think the opinion I am venturing here is not entirely lacking in solid scientific foundation. There has been described by the French medical school a condition in diabetics of advanced age which would seem to support my statement. Such old diabetic patients have been observed who, in spite of the fact that they were very rich, suffered from a mental delusion termed by the French savants "délire de ruine." These wealthy people harbored the delusion that they were threatened with immediate financial ruin, and that they were dying of hunger like the poorest beggar. And this in spite of the fact some of them were worth many millions.

We may perhaps better understand this strange mental condition when I mention that, according to my observations in many cases of diabetes seen during the last twenty-five years in Carlsbad, in nearly every case, when diabetes presents itself in a person of advanced age, it is caused by hardening of the arteries—arteriosclerosis—which involves also the arteries of the pancreas. Degeneration of the latter is, as is well known, the most important cause of diabetes.

As evidence demonstrating the truth of this observation, I may here mention a fact I published in the "Journal médical de Bruxelles" eight years ago, *viz.*, that in almost every case of diabetes in

old persons I succeeded in decreasing the amount of sugar or causing it to disappear altogether by administering iodine, the well-known remedy for arteriosclerosis.

In my book, "Old Age Deferred," I also showed that avarice can be caused by changes in the pituitary gland, mentioning two such cases. In the disease known as acromegaly, due to this cause, the hands, feet, nose, etc., enlarge to an enormous size, the face often presenting the appearance of that of Punch. Both of the patients referred to were millionaires, and one of them was also a diabetic. They both showed an altogether abnormal miserliness.

From the above it appears that avarice may not infrequently be related to physical and mental disturbances. At any rate it is the expression of an abnormal condition—weakness—of the human mind. It may not be compatible with a high degree of intelligence, and if craft and cunning are present in addition, is no more an expression of a high degree of intellect than the wit of the peasant stamps him as a clever person. That misers belong to a relatively low plane as to intellect likewise appears from the fact that the opposite of miserliness, *viz.*, liberality, is met with oftenest among persons, such as artists, who are gifted with great talents.

Again, the outstanding personalities who, as religious leaders, combined in themselves the highest sagacity and wisdom, exhorted their followers to exercise the virtues of beneficence to others and give freely to the poor. Indeed, Christ taught that one should love his neighbor as one does himself.

In the teachings of Moses repeated admonitions as to generosity are made, and upon a stone in the courtyard of the town hall at Eger, obtained from a synagogue that burned down in the sixteenth century, there appears the beautiful inscription: "Simple gifts soothe the wrath of God."

Mohammed, the Prophet, who had a tender heart for the poor, laid special stress upon the giving of alms, and there are no people in the world so liberal in their gifts to the poor as the Mohammedans. Nowhere in the world are there as many charitable institutions for the poor and needy, often erected centuries ago, as in the countries where Mohammedanism prevails. Charity, the giving of alms to the poor, constitutes one of the five holy commandments of the Islamic faith.

Nowhere have I seen so many beggars, and likewise nowhere so much of alms distributed, as in Morocco, one of the great strongholds of Islam. That there are still so many beggars in Spain may, I believe, be considered a remnant of the traditions of the Arabic rule in Spain. In the same way

many of the expressions used in Spanish are derived directly from the Arabic, *e.g.,* the pious exclamation "ojala Dios" (if God will have it) with which the Spaniard supplements all his statements concerning his future doings, just as the Arab always uses his "Insh' Allah."

On the inscriptions of the old Egyptian monuments dating from the time of the XIIth Dynasty, charity is especially recommended. The hungry are to be fed, the thirsty refreshed, and the naked clothed.

Even nature herself teaches charity. The gifts which nature vouchsafes with a free hand and in abundance to man should awaken in him a tendency to benevolence to his fellowmen and to animals. We should not let a day pass by without doing some good action to our fellowmen, and if there is no occasion to do some good to a needy person, at least one may throw a bone to a hungry dog.

I am fully convinced of the literal truth of the saying that "Charity brings its own reward," for the inward pleasure and satisfaction which follow a good action influence favorably the mind and the nervous system, and through them also the heart and the general blood circulation. The positive qualities of human character, such as kindness, love, and hope, prolong life, while the negative characteristics, such as hate, mistrust, avarice, etc., are

capable of shortening life owing to their irritant action on the nervous system, and consequently on the circulatory system, to which it is closely related. Likewise the many vexatious and frequent outbursts of anger to which they lead may be operative in this direction.

VIII

ANGER

WHEN a person becomes very angry, one may observe how the veins of his head, especially the forehead, become distended. As these veins are closely connected with the blood-vessels in the inner cavities of the skull and with those of the brain, their distention indicates that on account of the emotion of anger, certain changes on the blood-vessels of the brain, *viz.*, a congestion of these vessels, must have taken place.

That a marked congestion of these vessels can, indeed, arise, is best shown by the fact that there may occur sometimes in consequence of violent emotion, such as great anger, and the ensuing congestion, even a rupture of these vessels or apoplectic stroke. Of course such an occurrence is only possible, as a rule, if the walls of the blood-vessels are already diseased, as by arteriosclerosis, and their power of resistance against a great rise of the blood pressure in the blood-vessels diminished.

Such an apoplectic attack may not rarely be immediately fatal, although fortunately a fatal issue does not frequently occur. Many, after the first apoplectic stroke, recover after a time and re-

main alive for years—sometimes even a good many years if they lead a regular life, observing all the rules of personal hygiene, and especially, when able to abstain from tobacco, alcohol, and the pleasures of a rich table.

Although, happily, apoplexy is not a daily occurrence in cases of great anger, taking place only when the arteriosclerotic changes in the blood-vessels are very considerable, generally after the disease has existed for some length of time, yet violent emotion, such as anger, is apt to produce a great rise of blood pressure and influence very unfavorably the condition of the blood-vessels, promoting the arteriosclerotic process.

If this condition is already present, however, and especially if the vessels of the heart are themselves involved, life itself may be placed in jeopardy by anger in these cases. Indeed, it may bring on an attack of breastpang—the dreaded *angina pectoris*—which not rarely terminates in sudden death.

Apart from these harmful effects on the blood circulation, anger may also exert a very prejudicial action on the nervous system and promote the development of serious nervous and mental disturbances, especially in persons predisposed to such disorders by inheritance.

A particularly unfavorable action is exerted by it on the blood-vessels of the brain, and it may thus

to a marked degree favor the development of cerebral arteriosclerosis.

On the other hand, frequent outbursts of anger may be an indication of the existence of such a disturbance, and may often serve as a sign of it at its very beginning. Thus, I have frequently had occasion to observe that persons previously of a gentle disposition become strikingly irascible as soon as such a disorder becomes established in them. The irascibility which frequently appears in persons over fifty years of age, where it had not previously been present, may be taken as an indication of beginning sclerosis of the brain vessels. One of the most dreaded of nervous and mental diseases, progressive general paralysis, may, however, likewise be manifested in this way in its earliest stage.

In persons between the ages of forty and fifty years one rather often notices frequent outbursts of temper either without motive or from quite trifling causes, even in persons who had the gentlest dispositions in earlier life and were not easily aroused to anger. If, in addition, there appears a condition of nervousness not previously present and not induced by outside factors, it is advisable to ascertain through a medical examination whether syphilitic infection has not been previously contracted and how the blood responds to the Wassermann reaction. It is in such incipient cases of this dis-

ease, which is constantly growing more common, that the best results from the treatment, otherwise hopeless and useless, may be obtained.

In fact, it may even be possible to prevent the complete development of the disease, with its destructive effect on the mind. In persons threatened with this frightful disorder all causes productive of an outburst of temper must be carefully avoided, since excitement of any kind may induce such outbursts.

In view of the close relationship existing between the nervous system and general nutrition, one may readily understand how anything which arouses temper exerts an extremely harmful effect on the economy. Anger, in common with a great variety of other forms of excitement, may, indeed, be the source of a disturbance of nutrition which is frequently dangerous to life, *viz.*, diabetes. In my various contributions to medical literature on this disease I have described cases in which diabetes set in following some mental shock. Not infrequently a serious, incurable form of the disease is induced in such cases. In persons in whom diabetes already exists such a mental shock is followed by a marked increase of the sugar in the urine and the condition is aggravated. Not uncommonly the disease was observed to set in, as various writers have stated, after an outburst of anger because of marital un-

faithfulness of the wife or husband, or following unsuccessful speculation, etc.

Another type of nutritive disorder, *viz.*, gout, may likewise be made worse by emotional impressions.

Not uncommonly an acute attack of gout, in the form of podagra, comes on as a result of an outburst of passion, nature thus afflicting with severe pain at night persons who are unable to control their tempers.

Pain still more severe than that of gout may be induced by anger in persons suffering from stone in the kidney. The pain experienced in such attacks is far more dreadful than that of any other disorder to which man is subject, with the exception of tabes.

Only slightly less painful attacks that may be induced by anger are those of gallstone disease, which often bears some relationship to stone in the kidney. Both of these disorders may occur in the same person; the attacks of gallstone colic may be, and indeed, rather frequently are, brought on by outbursts of anger. That the latter exerts some influence on the circulation of the bile may be assumed from the fact that there are persons who become jaundiced after a fit of temper; disease of the bile ducts commonly exists in such instances. It is to be strongly recommended, therefore, to

persons suffering from gallstone disease or, more specifically, inflammation of the biliary passages, that they should shun, whenever possible, all causes that might induce an outburst of passion followed by gallstone colic. In a number of vocations, however, this is difficult to avoid.

I have long been struck by the number of lawyers among the many hundreds of patients with gallstones whom I have treated in Carlsbad during the last twenty-five years. Thus, disease of the biliary tract seems to be a common occurrence in members of this profession. Whence one might draw the conclusion that this honorable body of men busies itself solely with the defence of true justice; for in the opposite event it would be hard to understand how any "bile could be spilled" by them in the process!

IX

VANITY

IF there were no sexual instinct, vanity would not exist on this earth, either. For naturally it can be only a result of the sexual instinct if, in man or animals, the male or female tries hard to captivate the attention of the opposite sex. Man and the animals have, indeed, learned how to do this from their great teacher, nature. She is the secret promoter of vanity, through which she furthers her ends, and to which she clings with the utmost tenacity in order to ensure the conservation of the species.

With an eye to this, her sacred aim, she utilizes, among other means which in their cleverness must excite the admiration of even the most impious atheist and materialist, vanity, in order to excite the sexual appetite of the opposite sex, the co-operation of which is indispensable in attaining her object.

Accordingly, she makes the peacock spread its tail in order to solicit the admiration of the female through the sight of the wonderful brilliancy of its feathers, which are of almost unrivalled beauty. Unlike the human race, in the peacock species it is

not the female that deserves to be called the "fair sex," for she is clothed by nature in very modest and by no means pretentious garments.

Again, to promote the mating of the bird of paradise, nature induces the males to dance a pirouette before the females, meanwhile exhibiting the wonderfully rich coloring of their plumage.

She even goes so far as to make a certain species of woodcock, found in South America, construct a kind of dance hall in his endeavor to obtain the favors of his beloved, so that here, just as with man, the path to marriage frequently leads through the ball room.

This shows us that Terpsichorean art was in reality invented by Mother Nature for the purpose of serving the sexual instinct. Indeed, I believe I have demonstrated in my book on "Building Human Intelligence" that the fine arts owe their origin to the sexual instinct as the underlying motive. This applies also to the art of singing and to music in general.

This is plainly shown by the fact that nature has given the greater gifts in singing only to the males among the singing birds. Thus the male nightingale sings his most superb note only in the service of sex. The same is true of the other songsters. The males attempt to drive their rivals from the field by their finest songs, and the one that sings

the best is favored with the love of his elected mate. When the victory has been gained, however, it means also the end of the beautiful songs; thereafter the males sing no more, except perhaps to entertain their mates while building their nests and as a stimulant to the diligence of their little helpmates.

One might show similarly that the art of painting was likewise originated by nature. It likewise serves her purposes in promoting sex excitement and insuring the conservation of the species.

To this end nature makes use of the finest colors at her command. To the fish—a creature looked upon as a frigid, cold-blooded animal, but not with justice, for at least in a metaphoric sense, warm blood does, indeed, course through his veins—nature lends, under the influence of sexual excitement, the most brilliant colors—though only to the males. For in her great sagacity and pre-occupation for the conservation of the species, it is, in general, to the males that she has given the greater appetite in the sexual sphere, and to the female rather a sense of moderation and reserve, so that stronger means are required to arouse her sex desires.

In the waters of India there occurs a fish which nature has fitted out with the finest possible colors, the rainbow fish. When the season arrives for this fish to lay its eggs, the male swims about the fe-

male and turns himself in all directions just like a conceited dandy who is trying to win his lady with his charms. In doing so he permits his elected one to admire the great beauty of his scales, radiant with the most wonderful colors, his entire body glowing in a kind of brilliant fire. All this in order to tempt her to enter his nest.

How human these creatures are, or how much we are like animals! Just as lavishly has nature lent her most brilliant hues to the world of plants to assist in their propagation. For this purpose she uses the most striking and conspicuous colors at her command, colors such as will be seen from a great distance, to attract the attention of the insects adapted as intermediaries in the act of fertilization, *e.g.,* bees, butterflies, flies of different kinds, etc.

With her usual admirable foresight, nature has lavished the most striking colors upon the flowers of the mountain meadows. The reason for this—and it shows with what wonderful perspicacity nature does her work—is that in the high mountains the summer season lasts only a very short time and the insects must be stimulated by some extra means to the highest pitch of industry and speed in order to profit as much as possible from the short time at their disposal.

To this end nature attracts the fertilizing insects

with the most brilliant hue that she possesses in her box of colors, a special kind of red of great brilliancy, called anthokyan. This color, like conspicuous colors in general, and like the most pungent perfumes and finest aromas of flowers, is a result of the purest sunshine, the sun's rays in the mountains containing far more of the most active rays, the so-called "ultra-violet" rays, than elsewhere. These rays are the special producers of pigments and colors.

Nor does benevolent nature forget those organisms which are not allowed to enjoy the enlivening rays of the sun, the mushrooms that grow in the dark shadows of deep forests. To these she gives a lamp which glows at night in order to attract their worshippers. There is one of them, a species found in Brazil, called *Dictyophora phalloidea*, which resembles a little lady, most eccentrically clad. At night she puts on a little mantle which looks like a lace veil and which emits a glowing light to attract the insects. The people of Brazil call this mushroom "the lady with the white veil" (a Senhora con a mantilha branca).

In addition to these lights revealed at night time, some mushrooms possess an attraction of another kind for the insects, *viz.*, an odor. This odor is very repellent to human nostrils, being a kind of cadaveric odor, but for the insects which dissemi-

nate the spores of these mushrooms it seems to represent all the perfumes of Araby. "Naturalia non sun turpia" (natural things are not vile things), says the Latin. Herein we find but another manifestation of the great sagacity of Mother Nature in the interest of the conservation and propagation of the species. To this purpose she applies not only the most striking colors, but also the strongest odors, which she uses where it is necessary to attract the greatest possible number of insects.

Here again, I would like to point out how closely all this is related to things human. Those ladies who sprinkle themselves with the most powerful perfumes, dress very conspicuously ("en se faisant remarquer," as the French would say), and put a red flag on their faces (as Thackeray would say), are following, unwittingly, indeed instinctively, natural models. They are merely following patterns which nature created already thousands of years ago, long before man made his appearance on this earth. They are, as a matter of fact (and poor things, they are unaware of it!), simply puppets, which nature causes to dance as she pulls the strings.

Verily, one who knows how to read the great book that nature has written, even if he be a "doubting Thomas" of a most impious disposition,

cannot help admiring this marvellous foresight of nature and her great kindness to all her creatures, even the humblest. If only the theologians would occupy themselves a little more with natural history! Indeed, I think they could establish a most intimate relationship between theology and natural history. With one of the arguments above mentioned I believe they could convert more people to a belief in a wise, benevolent Creator than with a hundred arguments of a metaphysical nature.

But, I am sorry to say, some of the masters of divinity do not favor teleological arguments, and, if I may judge from my own experience, the protestant clergymen are, as a whole, more averse to such proofs of the existence of God than are the Roman Catholic priests. Indeed, according to Dr. Nisius, S. J., Professor in the widely known High School of Theology at Innsbrück (Tyrol), there is nothing in the teachings of the Roman Catholic church that would exclude the use of such arguments, drawn from nature.

Since, according to the above mentioned facts, vanity is founded upon entirely natural principles, being, so to speak, an institution nature herself created, it would seem perhaps out of place here to describe it as one of the ten chief causes of premature death; indeed, it would appear as if the satisfaction of vanity could not lead to conse-

quences that might prove deleterious to health. This may be the case, to be sure, when the satisfaction of vanity does not exceed ordinary limits, for example, when a person is merely trying by innocent means to place his person and his qualities in the most favorable light.

After all, nature herself does the same thing when she imparts striking colors to the plants in order to assist in their fertilization. Indeed, she utilizes her strongest agencies, her most impressive colors, only when special circumstances demand it. Thus, the modest violet certainly passes into the haven of matrimony without the necessity of having recourse to intoxicating odors to entice her worshippers, like the ill-smelling mushrooms that grow in the depths of the dark forest. These demure little flowers do not need to advertise themselves by conspicuous means—a fact which may serve as a hope and comfort to their human sisters.

Vanity becomes very harmful to us and one of the chief causes of premature death only when weapons of a less innocent kind are applied to satisfy the craving to please—only when the question is no longer one of placing in a favorable light qualities that already exist, but when such qualities as do not exist at all are simulated by deception. Such is the case, for example, when a woman insists upon forcing her stout body into

tight clothing, so that violence is done to her respiratory and circulatory organs which thereafter develop marked pathological disturbances. A number of life-shortening disorders are promoted in this manner. Particularly serious consequences may result where, as is unfortunately often the case, such women expect to become mothers and nevertheless want to continue to appear slim, or, on the other hand, instead of being proud of the state of motherhood, desire to prevent it.

Very serious effects on the liver and bile circulation may be caused by tight lacing. Actual grooves in the liver may be produced by tight corsets, as has often been noted in autopsies on the bodies of women. It is clear that the circulation in the vessels of the liver, which plays an important part in the elaboration of the bile, is markedly hindered by such tight wearing apparel. Aside from this, as well as from the hindrance offered to the circulation of bile owing to pressure upon the bile ducts, stagnation of the bile may also be produced as a result of the obstacle to the respiratory function of the diaphragm consequent upon the pressure of the corset. Under normal conditions the movements of the diaphragm promote the circulation of bile. It is not surprising, moreover, that in such women—as is very frequently the case—a serious and also very painful condition may

develop as a result of the stagnation of bile, *viz.*, inflammation of the bile passages or gallstones. The extremely severe pain which then occurs constitutes, indeed, a chastisement for the sin of vanity.

Still more dreadful pains may, however, be induced through vanity from the use of paints and hair dyes if they contain lead. When women and girls, otherwise grudgingly dealt with by nature, attempt to improve their unattractive, muddy and yellowish complexions or to impart some degree of freshness to their ageing features, we may condone such an attempt as a natural, human procedure, and as the author of "Old Age Deferred" I should be the last one to cast aspersions upon it. It is quite unpardonable, on the other hand, when, as is unfortunately often the case, very young women make it a practice to paint. It is not merely that they are thus nearly always made to look older and an otherwise healthy-looking complexion always harmed, frequently to an irremediable extent, but what is still more unfortunate, serious ill-health may result where, as is often the case with the most effective white paints and powders, the preparations used contain lead. Even small quantities of this toxic substance may cause poisoning if the paints and powders containing it are used for some length of time. Poisoning may occur even more readily if the hair is dyed with preparations con-

taining lead, which are very effective in changing the color of the hair or beard to brown or black.

The worst feature of this is that such poisoning in many instances comes on in a slow, insidious manner, until finally, one day, an extremely painful attack of lead colic sets in. Often such an attack is later repeated, but its true nature is not infrequently overlooked, so that the disorder is given an opportunity to exert further harmful effects in the body—effects often utterly irremediable—until finally the true cause of the disorder is successfully detected. Not a few of these cases later terminate fatally.

Persons previously in the best of health and robust in appearance are thus transformed into pale, emaciated beings constituting mere shadows of once beautiful women or well-nourished men.

From the effects of the deadly poison, lead, there may develop serious and dangerous changes in the brain, heart, blood-vessels, digestive organs, and liver, as well as in the kidneys. The condition is also one of the most important causes of the excessive formation of uric acid, with its harmful consequences. Mental disturbances may also be present.

Above all, the victim of this chronic lead poisoning—the result of vanity—may be dreadfully tormented by the attendant pain. As I lately had

occasion to observe in the case of a retired officer who had dyed his hair and beard for a number of years, this pain may occur in the same manner and with the same intensity as the painful paroxysms of tabes dorsalis, so that the making of a correct diagnosis may be attended with difficulty. In the case of the officer just mentioned, repeated examinations of the blood with the Wassermann reaction regularly gave negative results, and syphilitic infection was categorically denied, so that I was compelled to consider the dye containing lead as the cause of the severe attacks of pain. Besides, the man had become so strikingly thin as to be merely skin and bones, although as a landowner he had been able to eat plenty of food during the war.

Serious harm may likewise be done to the health when, as in the case of many ladies who are most ardently desirous of acquiring a slim figure, every possible means is taken to further this end. For this purpose the food taken may be reduced to the lowest possible amount; in young persons, in particular, whose growth has not been completed, this procedure may have very prejudicial results. If the body fails to receive enough of proteins, carbohydrates and fats in the diet, as well as of mineral substances, such as lime, for its proper development, serious effects on the health ensue, and in their

wake follow a number of diseases dangerous to life.

We have already alluded to the dangers of over-eating; but far greater are the risks attendant upon under-nutrition, for under these conditions the body lacks the very substances which protect it against various infections. In this manner, especially in young individuals, one of the diseases causing the greatest mortality, *viz.,* tuberculosis, may easily become established.

I have often found it necessary to recommend arsenic and iron in anemic women and girls—these being the very best drugs for such instances—but have been met with a refusal to take them on account of a superstitious fear that they would make their waists larger.

It should be borne in mind in this connection, however, that small medicinal doses of these drugs, used in conjunction with a suitable diet, could hardly exert any such effect, and that, on the other hand, their ingestion will as a rule promote a healthy and youthful appearance.

The women, however, do not draw their conclusions from the general run of cases, as do men, but judge rather by the isolated, exceptional instances that have befallen one of their friends. In many women vanity reaches such a pitch that they would rather continue ill than be restored to health

and present a healthy appearance. In many, indeed, morbid vanity is such that they voluntarily give up the greatest blessing at the disposal of the young married woman, *viz.*, motherhood.

X

AVOIDANCE OF PARENTHOOD

A WEDDING! What a delightful festival it means for mankind! But if it is the most delightful festival the *human* race can enjoy on earth, it does not mean the greatest happiness for all the other creatures of this universe. Especially is this not so in the short-lived world of the insects, for to them it means very often the beginning of the end.

The females of the insects survive but a very short time, for as soon as they have laid their eggs they must say farewell to the world and die. Nor are the males any better off if they belong to the group of the carnivorous insects. Their earthly pilgrimage is still briefer than that of the females, and above all, their end is far more tragic, for they are eaten up by their wives, out of pure love.

In the insect world there prevail very strange nuptial habits, for the "loving" wives devour their husbands! One of the species of insects to which this applies is that of the "praying crickets," a kind of locust exhibiting indeed a very pious aspect, for they raise their arms toward heaven in a praying attitude; the Provençaux call them "prego Dieu."

What a hypocrite the female of this species is, for she carries on in the insect world like a blood-thirsty tiger! With this insect the husband is eaten up already in the nuptial bed. As soon as he begins to court her, the "loving wife" begins to gnaw at him. Still he continues showing his attentions to his elected spouse, undeterred by her murderous attacks, and even after his loving better half has eaten up his head and "par dessus le marché," as the French would say, the half of his chest, this exemplary model of a husband still continues to fulfill his marital duties. He does not desist, indeed, until his "life partner" begins to devour his abdomen, the seat of his generative organs, a fact shown by the observations of the great French savant[5] and member of the Paris "Académie des Sciences," Fabre, who died a few years ago.

The insect just referred to gives us an example of how duty can be fulfilled even after death has taken place. For even as a headless corpse, after sacrificing his own existence, this insect persists in giving life to new creatures of his kind.

No less blood-thirsty are the nuptial habits of the golden scarabaeus, a kind of beetle with a body dipped in golden colors. In this species, likewise, the females devour their mates, but at least they

[5] J. H. Fabre: "Moeurs des Insectes, Morceaux choisis," p. 69.

grant them a short reprieve after the wedding, until they have laid all their eggs. Then, however, the husband "gets it in the neck," or more precisely, "in the stomach," for this portion of the body of the unhappy husband is eaten away by his better half, being, as a matter of fact, the only part of his body that is worth eating. In the period between June 15th and August 1st the five females that Fabre kept in his glass boxes in Serignan ate up all of the twenty males which were left with them, although otherwise well supplied with food. They had been together since April. From April till June no murder took place, and during this time the mating period elapsed. But after this period had passed, and the females had no more need of their husbands, they simply slew and devoured them. As the much quoted dramatic proverb says: "The Moor has done his duty, the Moor can go!"

Now, the strangest thing of all is, how could these great, strong beetles allow themselves calmly, without offering any resistance whatsoever, to be eaten up by their weaker halves? They did not even stir to prevent it, but acted as if it had been a matter of course, the most natural thing in the world!

The same thing was observed by Fabre regarding the males of the Languedoc scorpion. This

insect possesses a very murderous weapon consisting of a lance-like organ, of formidable aspect to other insects; and again, strange to say, he failed to use it even to defend himself against the cannibal attacks of the female, while she was in the act of devouring him. It seemed as if these strong insects had proceeded, like sacrificial lambs, to the altar, quite resigned to their fate, like the Oriental fatalist to his "Kismet." In the Arabic the latter word means "service." Indeed, these creatures were in the service of nature, and they met their fate with composure and died a cheerful death, as it were, after having fulfilled a kind of sacred duty in giving life to new creatures of their kind.

In presenting here these strange and gruesome examples from the great picture book of Nature, so often stained with blood—a book in which we find side by side pleasures and pains, birth and death, a book full of murder and all manner of cruel ends, and alas, all these often as a kind of logical necessity, the birth and life of one creature necessitating the disappearance and death of another—I do so with the intention of deducing from it an eternal truth, a truth which is written on all pages of the book in indelible characters, a kind of law, *viz.*, the law of the sex duty.

Nature exacts from her creatures that they should assist her in her endeavors to conserve their species.

From this there follows a sacred obligation of each creature, and man cannot be exempted from it, except in certain cases where vocation of a special kind, religious callings, or disease may constitute a hindrance to his giving life to a new creature before laying down his own!

To fulfill this aim, nature created the sexual instinct, which demands satisfaction in an overmastering way. At the same time, she facilitated the fulfillment of this desire by introducing, long before man made his appearance on the earth, the family life amongst certain animals, as a kind of model for the married life of man—a kind of a crude pattern of the holy institution of the church, the matrimonial union. Nature created the unity of the family in the more highly organized, intelligent animals, *e.g.,* in certain species of birds, parrots, swallows, storks, swans, nightingales, etc.

With these birds there exists a kind of marital union which could hardly be imagined to function better in man, and which, indeed, could with good reason be considered a model to follow for not a few human married couples. According to Brehm, the marital union of the birds is "the most faithful of all unions, which death alone can part."

An example of happy union is afforded even in the wild animals of prey. According to the celebrated lion hunter, Gérard, the lion is the most

gallant mate one could well imagine. He offers the best portions of his prey to his partner, caters to her desires in the way of food, and begins his own repast only when her appetite has been satisfied. The same could not be said of all human husbands!

Nature has her own ways and means of urging both animals and men to their marital duties. Frequently she supplies a most beautiful marriage-portion by lending to animals, as well as plants, most prodigal color effects for the purpose.

That the colors are given for this reason alone is shown by the fact that the handsome wedding garments are withdrawn when the end in view has been attained; thus, the brilliant coloring of fishes disappears after the mating season, the flowers similarly fade, and even man remains in his prime only so long as he is capable of carrying out his sexual and reproductive duties.

Nature also frequently hands out a special gift in compensation for the attainment of her object, *e.g.*, the provision of sweet nectar in flowers for the benefit of the insects which effect their fertilization.

If, however, all these proceedings fail, and if there occur individuals who disdain the nectar of love and refuse to enter into wedlock, nature is capable of assuming a different tone, and brings down upon them diseases as an answer to their

conduct in opposition to her designs. Thus, some persons are tormented with a very active sexual impulse, and when these fail to heed the call of nature and resist, neurasthenia or hysteria, as well as disturbances of the heart or stomach, may result.

Thus in many such men I have observed the presence of excessive acidity of the gastric juice, and in women the same condition in addition to marked gastric pain, eructations, abdominal distention, etc. A notable feature was the fact that among them there were many single women or widows who were quite unaware of their pronounced impulse in this direction, and indeed, were even wholly indifferent to the opposite sex; the impulse thus remained entirely submerged in their subconsciousness.

Impelled by their desires, many persons are quite ready to carry on their sexual functions, but unwilling to fulfill their duty of procreation. They are desirous, indeed, of experiencing the attendant enjoyment, but want to cheat nature out of the payment exacted therefor, *viz.*, the fulfillment of the duty of procreation.

Here again the transgressor does not remain unpunished. In men who interrupt the sexual act prematurely or use a preventive device, neurasthenia, disordered function of the reproductive organs, and in many instances even a partial or complete im-

potence are produced. Similarly, in women who utilize analogous devices such as preventive sponges and pessaries, neurasthenia and hysteria are of frequent occurrence. Now, to be sure, neurasthenia is not in itself a life-shortening disease, although it torments the person afflicted with it throughout life; it is capable, however, of rather frequently causing an elevation of blood pressure and, after some interval of time, of promoting the production of arteriosclerosis.

Such a "prophylactic," premature interruption of intercourse, affording only incomplete sexual satisfaction or none at all, may likewise have rather serious consequences as regards the reproductive organs themselves. The frequent local hyperemia resulting from the sexual excitement may very readily lead to inflammatory states of the ovaries and uterus and its covering layers, this, in turn, having a tendency to shorten life and even frequently causing death within a brief period of time.

The same unfortunate result may likewise occur from the fact that, as I shall explain more fully in the second part of this book, on the rapid ageing of women, such procedures promote in marked degree the occurrence of cancer of the uterus, which is a very frequent source of premature death in the female sex.

Early death in women is exceedingly often a re-

sult of disturbance in the reproductive tract. The latter is, indeed, the most marvellous appurtenance of woman, from which, as a variation of Goethe's expression, one may say there spring all her trials and woes, either directly or indirectly, and very often without her knowledge of the fact.

Already in the seventeenth century the great and widely travelled Flemish physician, Jean Batiste van Helmont, uttered the dictum: *Propter ovarium mulier est, quod est,* that is, woman is what she is on account of her ovaries, and I have shown in my books on "Old Age Deferred" and "Building Human Intelligence" that actually the whole outward appearance of woman, her entire being and action, all her characteristics and her manner of thought—which is altogether different from that of man—are dependent solely upon her reproductive organs and are influenced by these down to the minutest detail.

It is generally known that women are compelled to suffer more than men, but that this suffering is actually more readily borne by them than by men. This suffering is inflicted upon them directly or indirectly through the reproductive organs. The most frequent diseases of women involve these organs.

Unfortunately, however, such disease occurs without her being at fault and, indeed, in the course

of the fulfillment of her sacred duty, that of procreation.

There exist unscrupulous men who, before complete recovery from a disease of the reproductive tract, such as gonorrhea, dash into wedlock and transmit this disease to their poor, innocent wives, who are then often made to suffer from it the rest of their lives. Very many of the so-called diseases of women are merely the consequences of such an infection.

Or, they may result from miscarriages, which may be caused by syphilis in the marital partner, frequently without his knowledge and occurring as an indication of a syphilitic infection often contracted many years previously and as yet uncured. Miscarriages very often constitute the source of the diseases of women.

Frequently such miscarriages occur like lightning out of a clear sky. It is as though nature, in her wisdom, desired to prevent in this manner the propagation of damaged seed.

It would really seem incumbent upon us to assist nature in her efforts in this direction and not to permit the occurrence of miscarriage, a condition dangerous to health and even to life. We should in good time prevent such individuals as are unsuited for propagation from contracting a marriage at all.

Avoidance of Parenthood

Over two thousand years ago Plato already demanded that before marrying, every man and woman should undergo a medical examination, and my own humble declaration in favor of this course was made long ago. Until the time when such a law is enacted I would recommend to all parents not to allow their child to marry any man or woman unless he or she can produce a medical certificate of fitness for marriage stating, at least, that he or she is not suffering from any hereditary or infectious disease, and that the Wassermann test of the blood is negative.

Untold misfortune could be thus obviated in many, though unfortunately not all, instances, and many women would be spared a life-long martyrdom. For as matters now stand, many women are the actual martyrs to their duty, in particular when we consider that often, in the fulfillment of their procreative obligation, and while they are giving life to a new being, they are often compelled to sacrifice their own.

Woman has, indeed, come out with the short end of the bargain in human reproductive life; she is often like the soldier who must stay at his post and lay down his life. To be sure, the fact cannot be denied that if woman is exposed, on account of her sexual life and the attendant consequences, to early death—death while relatively young—far more than

is man, this is not inevitable and is frequently brought about through her own fault.

Every girl and every woman should undergo a medical examination before marriage and before childbirth. In this way anemic girls should be prevented from marrying until their chlorotic condition—or their pulmonary disease, if present—has been recovered from. This is something which I am constantly preaching to mothers with anemic daughters, and which is unfortunately often disregarded. Hard labor or miscarriage, indeed, occur very frequently among women who are not entirely healthy, that is, have previously been sick.

And not infrequently the imprudence of a woman is responsible for a miscarriage. Many a woman, in her enjoyment of life, forgets the sacred obligations entailed by future motherhood, indulging herself in dancing, riding, sports, mountain climbing, etc., during the earlier months of pregnancy. In this connection we learn from history that the wife of Emperor Maximilian, the beautiful Marie of Burgundy, although some months pregnant, joined in a hunt, was thrown from her horse and lost her life in consequence of a miscarriage thus induced.

Even where miscarriages run a favorable course, they may very frequently be the source of persistent disorders of the reproductive organs, with

serious results as regards the general system and even premature death.

Highly dangerous consequences may obtain where a miscarriage is artificially induced.

As various statistical records have shown, the result is a miserable death in the very great majority of cases, the introduction of infective germs through the puncture of the membranes which brings on the miscarriage resulting in septic infection of the blood-stream and death after frightful suffering.

While the consequences of abortion are not in all cases so tragic, other serious effects which may likewise prove fatal after a varying period of time may be produced, since even in otherwise successful abortions portions of the ovum or its membranes may remain behind and this be followed, through the agency of the ever-present putrefactive germs, by severe suppurative inflammation of the uterus.

If death does not result, there follows a disturbance which often continues for a number of years and requires serious operations, with the result that the woman's general health is markedly undermined and her body reduced practically to skin and bones.

Again, even if no putrefactive processes set in and the disturbance runs an otherwise favorable course, the fact that extremely often there has remained behind a portion of the ovum or its covering membranes may give rise to frequent

hemorrhages from the uterus, which prove very debilitating to the woman, or to the development of tumors, such as polyps of the uterus; further, there may be thus induced inflammations of the uterus and its covering membranes which may again persist for several years.

Thus, the result is that, through these procedures, even if their serious consequences are avoided, the women remain in a sickly condition and show a muddy, yellowish complexion; and this, of course, is the surest way of bringing about rapid ageing in previously fresh-looking, beautiful women.

The female organs are so sensitive to the different manipulations not of a normal nature, that the various preventive measures against conception, sometimes employed by those fearful of responsibility, are capable of causing great damage to the organs, and often very serious disturbances. At the least there remains, as a rule, a marked nervousness, conditions of excitement, insomnia, etc., whereby the physical appearance of such women may be impaired. It is certainly true, according to my conviction, that a woman addicted to such anticonceptional practices never looks so healthy and fresh as a married woman who lets nature take her free course and does not curtail the rights of nature.

Nowhere in my travels—and I have travelled to

a fair extent, having already seen the whole of Europe, except Turkey; the greater part of the United States and Mexico, and North Africa—have I observed such fresh and healthy-looking women as the French Canadians in Quebec. These women are also of great beauty as a result of the happy admixture of the French Breton blood with the Irish.

It is a well-known fact that the Irish women are among the most beautiful women of Europe; in general, the women of all the Celtic races can boast of marked beauty. Most of these women of Quebec have many children, sometimes six or eight, or even more, and strange to say, it does not seem to impair their looks.

The French Canadians are the descendants of the Bretons who emigrated from France several hundred years ago to America—of a race renowned even now in France for its good qualities and proverbial honesty and faithfulness. Like all the Catholics who live as a minority in countries that are largely Protestant, *e.g.,* the Irish in America and the United Kingdom, and the Catholics in Holland, they are distinguished by a marked devotion to the church.

Now, the Catholic church abhors all practices that tend toward the prevention of motherhood, and metes out the heaviest punishment for them; but

the greatest punishment at her command she lays on abortion criminally provoked, *viz.,* excommunication, or practically, exclusion from the church.

Aside from the scruples of conscience, the fecundity of the French Canadians may have been favored by the fact that this happy people lives under very favorable material conditions. They possess a most fertile soil, which produces some of the finest wheat of the world, similar to that of the province of Manitoba, likewise famous for its products of the soil.

However, even in countries where the soil is less fertile I have often noticed that particularly the families blessed with many children are better off than those with few children.

The abundance of children proves a decided stimulus to work for the average father of a family, and at the same time it has a very wholesome influence upon his character, for in such men it is rare that such bad habits are formed as hard drinking, nocturnal dissipation, gambling, etc.

Thus I believe it was with full justification that in my book, "Old Age Deferred," I dwelt upon the great advantages of married life as a means for longevity and against early ageing. Alas, the writer of these lines had not yet had the leisure and opportunity to follow his own precepts and get married, but the five terrible years he recently

went through were not propitious for such an undertaking.

The possession of many children proves indeed a stimulus to work for the honest father of a family. Where many childish mouths are opening daily he is obliged to put into each of them something to satisfy a healthy appetite, and so must work the more.

So it is with man; but it is the same thing in the animal world, for it has been so ordered by nature that the parents must work and provide for their young.

The bearing of children leads to this necessity, both in man and animals, of obtaining the wherewithal to rear them. And so one sees quite plainly that there is a direct connection between the sex instinct and work. The one leads necessarily to the other. Thus nature teaches man and also animals to work. Indeed, there are many examples in nature, from the animal as well as the plant kingdoms, that nature is the great schoolmistress for work.

She makes man and animals work by giving them the instincts of hunger and sex. Hunger forces them to work for its satisfaction and the sexual instinct, after having been satisfied, leads necessarily to work through the consequences of the same, the children or young that are born having thenceforth

to be fed. The necessity of providing for their young drives man and animals alike to work!

Solicitude for the offspring manifests itself in all living creatures, even plants, but strange to say, only with man, the king of earthly creatures, does it seem to be sometimes wanting. It would appear that such a thing as the prevention of motherhood is entirely unknown in the animal world; it seems to be only a human invention. Among the animals an occasional murder of the offspring may take place, but if it does occur at all, it occurs incomparably more seldom than in man.

As a rule, under such conditions it takes place a short time after the birth of the offspring. A mother cat, for example, might eat a newborn kitten on the first day, or a sow a newborn pig. In such instances, there is an extenuating factor that applies also to the human child murderess, *viz.*, the mental aberration so frequently present immediately or a short time after birth.

In animals, murder of the young is often based on practical motives. Thus one may sometimes observe, even with some of the more intelligent species of birds, that they kill their young when these are in defective health and unable to support the fatiguing journey to the southern climates at the approach of cold weather in the fall. But the same thing has occurred also with some of the

primitive peoples, *e.g.*, with the Patagonians, whom the explorers described as killing their old women. Even some of the most cultivated nations of bygone ages resorted to such expedients, and of the Chinese, travellers even in recent times relate such treatment of children in deficient health or of the female sex.

Why, then, should we look askance at the animal kingdom on account of such occurrences when some species of the most intelligent creatures and masters of the earth persist in setting the bad example, even though, as a rule, no similar excuses for these acts among them can be offered? It seems to me a positive fact that, on the whole, as regards motherly love and the rearing and careful treatment of their young, animals, and especially the birds, which stand higher in brain capacity, as a rule, than other animal species, could be held up before many women and men as a noble example for them to follow.

Whereas there are women who fail to look out and provide for their young, and men who are so vile and heartless as to throw the burden of motherhood on a poor girl and forsake her afterwards, one may readily see—and it is one of the most touching sights—with what zeal in the bird species the father and mother work to fill the beaks of their young.

Many a leisure hour have I spent enjoying the sight of a hen leading her little chicks about and observing the care and attention with which she instructs her children.

In the animal kingdom are to be found many examples of sacrifice on the part of the mother for her young. This applies not only to the more highly organized animals, but likewise to insects and the like creatures. Thus, Bonnet,[6] a prominent Swiss naturalist of the eighteenth century, observed that a certain mother-spider—*Aranea saccata*—which he dropped into the burrow of the blood-thirsty ant-lion, courageously defended the sac fastened on her back and containing her eggs, which the ant-lion pulled away.

Instead of abandoning her eggs in order to save herself, she went to her doom with them, constituting an example of a self-sacrificing mother love of such degree as would not often be observed in man.

Aside from the spider, which, of course, is among the most intelligent of invertebrates, as indicated by its marvellous spinning and bridge-building art, in which it was already an adept thousands of years before the advent of man, mention may be made of a much despised creature as an example of tender motherly care, *viz.*, the common house fly.

Whereas there are persons who harbor no scruple

[6] Quoted by Kirby and Spencer, Entomology, Part I , p. 309.

in bringing children into the world without concerning themselves in the least about them, no mother-fly would ever deposit her eggs without having previously taken care to secure for them the necessities for their future existence.

To this end she deposits her eggs upon various food materials, the quality and suitability of which have often been investigated beforehand. This procedure is followed with great circumspection in many kinds of wasps. These insects puncture, with a dexterity no professor of animal physiology could imitate, a nerve ganglion situated in the back of the head of the worm which they have made their prey, thereby paralyzing him. The worm is thus rendered motionless, but remains alive nevertheless until the larva crawls out. The larva would have perished had the worm already become the seat of putrefaction; the wasp therefore allows the worm to stay alive for the purpose.

A beetle known as *Balaninus elephas,* which feeds on acorns, hazelnuts, etc., works with sagacity and exceeding industry in the interest of its posterity. It bores a hole into the acorn for the purpose of depositing an egg in it. For boring purposes nature has provided it with a sharp boring instrument not unlike a long spear. The work done by this beetle is decidedly tedious; according to the observations of Fabre it takes it as long as eight

hours to bore through to the bottom of the acorn. Here, in the depths of the acorn, is located the soft, succulent mass which the newly hatched larva of the beetle requires.

Even after its prolonged, hard, and laborious task is completed it may happen that the beetle cannot lay its egg if it finds on closer investigation that the condition of the nutriment in the acorn does not answer the requirements of its offspring. A man would be tired out after the eight hours of hard work; but not so this beetle with its mother-love. It proceeds to bore into another acorn in the same way. I am certainly not mistaken when I say that many a mother would not be capable of such perseverance. The strangest part of it is that these insects, like the flies and locusts and many other kinds of insects, are never permitted to see the offspring for which they have been working and toiling so hard; for such is their tragic fate, that they are doomed to die very soon after they have laid their eggs, in fact, often immediately after it.

How cruelly nature treats the insects, some of us may say. One might even use blasphemous words in criticising nature for such behavior.

And yet the wise man will find in this another instance of nature's great wisdom and foresight.

Before unjustly criticising nature one should re-

member that if she were to allow but one pair of insects to reproduce their kind for twenty-five years without hindrance or danger to their offspring, and without any of the eggs laid during this period being destroyed, the earth would swarm with them, they would be met with crawling about everywhere, and all balance and equality in nature's household would be lost.

The natural consequence of the foregoing is that death is a bitter necessity! Life of some of the animal species, such as the animals and birds of prey, for example, is possible only through the death of another species. This holds good for man as well, and so we see that the death of animals and plants is essential to the life and welfare of man.

When the strict vegetarians invoke, as they sometimes do, as one of their chief arguments that it is a sin to kill living creatures, thus abhorring the sacrifice of animals for our sustenance, I should like to remind them of the fact that plants are likewise living creatures, showing similarity in their build and structure, their anatomy and physiology, to man and the animals.

It is again a species of murder when uncontrolled and mischievous children tear out a plant with its roots, just to play with it and later throw it away.

Life Shortening Habits

There is no escape from the fact that we can only live and exist by putting other creatures to death. It is a bitter truth, that life produces death, but it is also true that death engenders life. The same hand that gives death also gives life.

Here again there is occasion to admire the remarkable foresight of nature, and likewise her benevolence to all creatures, for she has given the greatest fertility and countless, even millions, of eggs to such of the animals as live for a very short period of time, and to such of the creatures as are most exposed to persecution on the part of other animals or of man. This explains, *e.g.,* why oysters and herring produce so many millions of eggs.

Such a precaution is not necessary in man. Being endowed by nature with wonderful intelligence, he has the weapons wherewith to defend himself successfully against the countless dangers which threaten all living creatures without exception. For this reason nature has limited the fecundity of the human race to one or occasionally two children.

But for the very reason that the offspring of man is so restricted in comparison with other creatures, it would seem to be his duty to care and provide the better for the children he has, a duty in which the short-lived insect world sets him a splendid example.

And whereas the possession of such a charming

creature as a child proves a powerful stimulus to the affection and love of the mother, such a stimulus is entirely wanting in the insect world, for with few exceptions, such as the spider—which is not a true insect—they never see the offspring to which they have given life. Yet, as described above, insects are capable of working for hours, indefatigably, for children they will never behold!

Now, if one does not care to attribute to the insect a prophetic gift, the ability to foresee events that will take place after its death, and likewise a rare conception of duty and high intellectual qualities which prevailing scientific opinion would deny even more highly organized animals, naught remains but to confess that it is nature herself who, by instinct, compels the insect to work. We have in this, indeed, a very instructive example of how nature drives on her creatures to labor as the natural consequence of an instinct, that of sex. By planting the instincts of hunger and sex in the breast of each creature, she forces them to work.

Every living creature is thus destined by nature to labor, and he could no more withdraw himself from work than he could exist without feeling in his bosom these two powerful instincts, self-preservation (*i.e.,* hunger) and the sexual instinct. No normal creature on this earth fails to experience these pangs.

Life Shortening Habits

Every creature, be he a king or a pauper, is in essence a worker. The animals are likewise workers.

Even the earth worm! When the careless child treads on and crushes the despised earth worm, little does he know that it is to the worm that he and his parents owe in large measure their daily bread; the worm, that with tireless energy penetrates and drills the earth in all directions, thus assisting in its ventilation and contributing to its fertility!

Even the plants are workers. For if they did not work they could not exist. They do work in manufacturing starch from the carbon dioxide of the air under the influence of the sun's rays. They are also working when they draw up from the soil the mineral salts which are indispensable for their nutrition and maintenance.

They are compelled to work, too, in the interest of their fertilization by manufacturing the sweet nectar, which they present as a fee to the insects that constitute the intermediaries in the propagation of their kind. Still harder work must they perform when, lacking such intermediaries, they are obliged themselves to carry out self-fertilization.

Thus, wherever we look into nature, we see work going on, and as the chief motive in work we find everywhere the same causes, *viz.*, the instincts, hunger, *i.e.*, the instinct of self-preservation, and sex,

i.e., the instinct of procreation. In matrimony we note the intimate connection between the instincts and work as their direct consequence. Sex leads to the blessing of man with children, and this, in turn, proves a powerful stimulus for work to the parents.

The greater the blessing, *i.e.*, the more children there are, the more diligently the work is done, the greater the industry, and the greater the success of the clever worker. In families in which the father works diligently no inducements are afforded to practices tending toward child prevention, especially in Europe in the present period, after the loss of millions of male workers.

Work is of divine origin, and a great promoter of health. When the muscles are active more blood circulates through the vessels, organic processes and combustion in general are enhanced, and the general health is improved.

Among all the varieties of work, there is none that equals in its benefits that of the rural, rustic laborer. To the muscular exercise are added the benefits of the fresh, open air and the effects of the rays of that health-dispensing and life-giving celestial body, the sun. There is probably no other form of labor, moreover, which so certainly and in so many ways repays the work expended as that relating to mother earth, the soil. It constitutes

also the safest investment, a lesson taught by the consequences of the late war, and which the writer of these lines should have learned beforehand, for he would then not have lost all his means, invested in supposedly safe securities.

On the whole, every form of work and all manner of activity is beneficial to the body. Activity results in a better supply of the vessels and tissues with that life and health giving medium, the blood. There is also literal truth in the Arabic proverb, "Hareket bereket"—"activity brings riches." It also brings health, *if carried on within reasonable limits,* and can best serve the purpose to which this book is dedicated—the prevention of premature death.

PART II

The Rapid Ageing of Women

INTRODUCTION

TO PART II

CERTAIN modern, harmful tendencies of personal conduct which have been rather obtrusively noticeable of late induced the author to take up for independent discussion these and other shortcomings and sins of omission—not all of them appertaining, however, specifically to the female sex—which could not be dealt with in his book on "Old Age Deferred," on account of lack of space. As these shortcomings expose womankind not only to rapid ageing but also in many instances to premature death, it would seem highly desirable that the admonitions herein presented should fall upon fertile soil.

I

THE INFLUENCE OF SMOKING ON THE FEMALE ORGANISM

THE shrunken and flaccid features and facial muscles of even relatively young women from Russia, Greece, and the Orient who came to consult me in Carlsbad in the years preceding the late war were often very striking, and when I inquired into the cause of the condition, I found that nearly all of these women were smokers, and had been addicted to the use of tobacco for years.

That their appearance was not the result of some other factor, such as climatic influences, was shown by the fact that I observed the same condition in women from western countries, who were heavy smokers. Thus, in 1914 I had occasion to see a young lady from New York, who had previously been a renowned beauty, yet at that time, in spite of being only twenty-eight years of age, looked like a woman of about forty, by reason of her yellowish complexion and flabby, withered features. She smoked cigarettes from morning till night, and was afflicted with a distressing cough, doubtless also on account of her passion for smoking, which even kept her from sleeping at night.

There have also come under my observation in the last few years young lady patients from the interior who—doubtless as one of the many unpleasant manifestations consequent upon the late war—were likewise tobacco devotees and showed the same premature flabbiness and "fading" of the features, together with somewhat sunken cheeks, and eyes that had lost the fire of youth.

Aside from their flabby and drooping facial musculature, all these women and young girls showed a similar condition of the other muscles of the body. They were no longer so sprightly and resilient as healthy women and young girls generally are, their fatty covering layer had disappeared—as had also in part the muscle tissues themselves,—the muscles were reduced and flabby, and the overlying skin of an unhealthy pallor.

All this need not surprise us when we reflect that tobacco, according to the investigations of Hertoghe, is highly prejudicial to an organ upon which the tone of all the muscles and tissues of the body, and consequently its freshness of appearance, depend, *viz.*, the thyroid gland. The latter is, indeed, one of the most important organs in the body.

The thyroid gland regulates all the vital processes. Body nutrition as a whole, blood formation and the circulation, the activity of the heart,

the entire nervous system, and even the condition and outward appearance of the skin and its appendages, the hairs, are under the control of its powerful influence.

The thyroid plays a particularly important rôle in the life of woman, owing to the fact that, through its close relations with the reproductive glands, it takes an active part in all modifications of the latter organs.

Thus, swelling and enlargement of the thyroid gland frequently occurs during menstruation. Even among young girls this organ enlarges during the period of puberty, and in pregnancy it often attains a considerable size or may even become an actual goiter. Thyroid enlargement frequently occurs in diseases and altered conditions of the female reproductive organs, as well as during the most trying stage of woman's sexual life, in which she bids farewell to youth and becomes an elderly person, namely, the change of life or menopause.

All this accounts for the fact that goiter is a commoner condition in women than in men. In the former, because of the special circumstances of their sex life, this important gland is driven to much greater heights of activity than in men, and for this very reason rapid ageing is likely to occur oftener in relatively young women than in men.

Reflection upon the important function of the

thyroid gland above referred to will lead one to understand even more plainly why morbid changes in this organ open the way to rapid ageing in women.

This is especially evident in a certain disease condition characterized by complete or partial wasting of the thyroid gland—myxedema.

The highest grade of this thyroid failure to which myxedema is due is but seldom encountered, but partial forms of it, consisting of a simple weakness or debility of the organ, are much more frequent, in fact of every-day occurrence. The symptoms arising from such a condition are so numerous and frequently so inconspicuous, that it is not surprising the disorder sometimes remains unrecognized and patients live and die with it in the absence of any clinical diagnosis of the disorder.

There exists, however, a group of typical symptoms by virtue of which, when they occur together, the condition betrays itself to the specially trained medical eye. Among these may be particularly mentioned premature grayness and loss of the hair, the occurrence of obesity without an excessive intake of food (though but seldom in smokers), the premature appearance of wrinkles and creases in the skin, irregular menstruation and frequent flooding, lassitude, impaired memory, and a yellowish, dry facial skin, with flabby features, etc.

Influence of Smoking

To these symptoms are added, in the more advanced cases, puffiness below the eyes, bloated face and hands, and a marked sensitiveness to cold.

These women nearly always exhibit a more or less pronounced nervousness, though in the more advanced cases there is an actual state of apathy. According to Hertoghe, gallstone disease is of exceedingly frequent occurrence in these women.

That such premature ageing is dependent upon changes in the thyroid gland is most strikingly shown in that upon ingestion of fresh preparations of this gland nearly all of the symptoms above referred to are improved or caused to disappear, as I have often personally had occasion to observe and have noted in a previous work.

Yet it should be emphasized that this drug, which is by no means harmless in the hands of the laity, should be taken only under the close supervision of a physician—in which event, according to my own experience extending over many years, such ultimate unpleasant effects as cardiac palpitation, sleeplessness, copious sweating, etc., may with certainty be avoided.

To obviate rapid ageing of women, therefore, all harmful influences reacting upon this gland, which plays so important a rôle in their lives, must be carefully avoided. Of these prejudicial factors tobacco comes next to alcohol, according to the in-

vestigations of Hertoghe[1] in Antwerp. At first it stimulates the thyroid, but this is followed by excessive activity, and the latter, in turn, as is observed in all other glandular organs and with especial frequency in the reproductive glands, by exhaustion and such a state of inactivity that the gland can no longer carry on its many important functions, or do so only in an imperfect manner.

The thyroid gland is likewise harmed by tobacco in the male sex, but the injury caused in women is far more lasting, because the thyroid in the latter, by reason of the various phases of female sexual life, particularly pregnancy, lactation, and the menopause, as well as the irritations and diseases of the uterus and ovaries, is much more exposed to overstrain and various fatiguing influences than that of the male.

Because of the differences in bodily construction and the special circumstances of the sexual life of woman, the latter is already less capable of resisting the effects of tobacco than man, for tobacco acts very prejudicially not only on the thyroid gland but also on the sex glands. This has been shown by a series of experiments carried out on animals. Clinical experience teaches that in the male sex impotence may occur as a result of im-

[1] Hertoghe: "Der chronische gutartige Hypothyroidismus," Lehmann's Verlag, Munich, 1900.

moderate use of nicotine. Its effect on the function of the ovaries is no less harmful, so that in women disturbances of menstruation and even sterility may result.

While tobacco produces harmful effects on women who are already completely developed sexually, its injurious action is even more serious in incompletely developed, immature young girls, among whom smoking nowadays is unfortunately becoming more and more prevalent. Indeed, the pernicious influence of tobacco on the organisms of young girls is, in my opinion, a matter which the governmental authorities cannot allow to pass unnoticed.

Such a multitude of men have been lost as a result of the war, whether on the battlefield or through disease the result of privations and inadequate nutrition, that it would be a great pity if those who embody the hopes of the nation were so seriously to imperil their sublime duties as future mothers and propagators of the race, out of sheer folly and childish whims.

This condition logically calls for the passage of laws that will forbid smoking by young women and impose a severe penalty upon the purchase of tobacco by them. It would also be a highly desirable thing for the welfare of the people if the clergy would exhort parents, from the pulpit,

to exert a more strict control over their children in this direction and impressively warn them against any indulgence and lack of reserve which would later wreak a terrible vengeance from the health standpoint, not to mention that of morality.

The delicate body tissues of young girls, in common with those of the female organism in general, are far more jeopardized by tobacco than those of men. Nicotine acts, like most other poisons, in a direct manner on the tissues, and in particular upon those of the blood-vessels, as was first demonstrated by the investigations of Adler and Hensel[2] and later by a number of other workers. While they are perhaps not identically the same, these tissue changes strongly suggest those found in hardening of the arteries.

Everyday clinical experience shows that hardening of the arteries occurs especially early in heavy smokers.

As already mentioned in the first part of this book, there is, aside from syphilis, no other factor (not even alcohol) which plays so harmful a rôle in the production of arteriosclerosis as heavy smoking. The first result is an elevation of the blood pressure, which, as is well known, favors the production of arteriosclerosis in that a state of tension in the vascular channels is maintained which is

[2] Deutsche medizinische Wochenschrift, No. 8, 1906.

later accompanied by morbid changes in the tissues of the vessel walls.

As the condition proceeds further, there next results a narrowing of the lumen of the vessels, so that the tissues are only with difficulty and inadequately supplied with blood. Owing to insufficient nutrition of, for example, the hair follicles, the teeth, etc., these appendages then fall out, and owing to scanty nutrition of the tissues of the skin, the latter undergoes shrinkage, and folds and wrinkles make their appearance. Not so unreasonably, therefore, did French investigators long ago make the statement that every one appears as old as his arteries are. ("On a l'age de ses artères.")

Yet it would be a mistake to think that this condition of affairs occurs only in persons of rather advanced age. Even a considerable number of young men have hardened arteries without being aware of it, as was demonstrated in the late war, in many tissue sections from young soldiers who had never complained of any bodily disturbance during their life time. As a rule, only heavy smoking leads to such serious results, unless it be in the children of arteriosclerotic parents or in young girls and women, on whose delicate tissues smoking acts much more detrimentally.

Particularly harmful in this connection are cigars of high nicotine content. Fortunately, women who

smoke cigars are not many. To my mind a cigar in the mouth imparts to any woman, however beautiful, a rather mannish aspect, and when, some years ago, I was taken to a ladies' club in Copenhagen, in which the women smoked one cigar after another, I was led mentally to supply beards and side whiskers on their faces.

On the other hand, I cannot, in all fairness, assert that an occasional cigarette in the mouth of a lady would give her an unwomanly appearance. Furthermore, the harmful effects previously described should not occur if women already completely developed in body and mind smoked a few small cigarettes a day. Only if they are the offspring of parents suffering from hardening of the arteries should they preferably abstain completely from smoking.

It is important, however, that smoking should never be indulged in on an empty stomach, that only a very mild variety of tobacco should be used, and further, that it should be smoked slowly and not in rapidly repeated puffs, that the smoke should not be inhaled, and that it should not, as foolish girls in their teens are so fond of demonstrating, be swallowed and then blown out again through the nose. To those ladies, however, who are so slightly vain that they are unwilling to give up the immoderate use of tobacco in spite of the risk to

their beauty it entails, I would recommend that they take plenty of food.

It is a well established fact that we withstand all kinds of intoxications better if we take ample amounts of food, especially of the albuminous va-variety, since these very materials serve for the building up of the important substances which protect us as antidotes or antibodies.

Unfortunately the taking of ample amounts of food by heavy smokers meets with the difficulty that their appetite is often poor, and that the tobacco only too often leads to undernutrition by causing disturbance of the functions of the stomach and intestines. This, in turn, becomes a further cause of rapid ageing in women.

II

THE INFLUENCE OF INSUFFICIENT NOURISHMENT AND REDUCTION CURES ON THE FEMALE ORGANISM

IT is a matter of common observation that women of the poorer classes age rapidly, as a rule. It seems natural to attribute this to hard work and a scanty intake of food. That insufficient nourishment is the main factor, however, follows from the fact that the same condition is witnessed among women who are engaged quietly in household duties or sew the whole day long.

The rôle played by inadequate nourishment is most strikingly shown in that an aged appearance may be produced even among women of the more well-to-do classes as a result of ill-advised reduction cures.

The outward appearance and attractiveness of the human body, as well as of animals, bears a close relationship to the quantity and choice of the food taken.

When animals such as the dog, cat, or horse, are well fed, their coat becomes glossy and their general appearance more handsome and more full of life. In the well-filled, firm cheeks of healthy-looking, well-nourished young girls the muscles of

the face are covered with a layer of fatty tissue which, as it were, pads out the skin and renders it smooth.

If, on the other hand, the food intake is scanty, no fatty material, nor any sufficient amount of the starchy foods capable in part of replacing it, *viz.*, rice and potatoes, are ingested, and as a result the facial muscles lack the necessary amount of fat.

In reduction cures, again, unless carried out under expert supervision, the fat over the facial muscles disappears, the cheeks become hollow, and there develop lines, wrinkles, and creases—in a word, the facial appearance of advancing age. In cures of this kind one must take care that the fat is absorbed only from those portions of the body in which it is deposited in large amounts, as, for example, on the abdomen, over the hips, on the back, on the chin, etc.

It is dangerous for women who are actually by no means stout and have merely muscular hips with but slight fatty deposit to go through fasting cures. In doing so they are cutting into their own flesh, and frequently they pay for it with an aged appearance.

According to my experience with numerous patients in Carlsbad, reduction cures yield the best results where the nourishment taken is adequate and foods of the most different kinds are repre-

sented, *i.e.*, the diet is a highly varied one. Fat-forming articles of food, such as sweets, rice, and potatoes,[3] must, of course, be restricted, but the diet must not be reduced to the point of inadequate nourishment; indeed, such a reduction is unnecessary if baths, exercises, long walks and the Bergonié treatment occupy an important place in the therapeutic régime.

In suitable cases, *i.e.*, where the heart is in good condition, an intelligently conducted course of thyroid treatment is capable, according to my experience extending over many years, of yielding very good results. Instead of an aged appearance following such reduction treatment, one of rejuvenation may rather be obtained—a result already familiar from experience with thyroid treatment under other circumstances.

Only fresh preparations of the gland must, however, be used; the patients must remain under continuous medical supervision, and the diet used must be sufficient in amount.

Particular care should be taken that it includes the different kinds of foods. It should be emphasized that even if enough food is supplied, undernutrition may occur if the food is not suf-

[3] A complete list of these foods is to be found in my book entitled: "Health and Longevity Through Rational Diet," in the chapter on "Foodstuffs that Produce Obesity."

ficiently varied. The organs of our body require for the prosecution of their functions not only albumins, starches, and fats, but also certain salts, the nutrient salts, together with a number of other substances, such as the so-called "vitamines," the higher fats or lipoids, etc.

Similarly, the thyroid gland requires iodine, the ovaries iron, the joints and teeth lime, the hair sulphur, and the skin silicates, all of which substances play an important part in the chemical constitution and physiologic activity of these structures.

Now, if food is taken in insufficient amount, or is improperly balanced, or contains too little of the substances just referred to, disturbance of the functions of these structures and morbid changes in their constituent tissues may result.

Insufficiency of nutriment thus exerts a highly prejudicial effect on the female sexual glands and thereby likewise on fecundity. Undernutrition is an important cause of sterility in the human subject just as it is among the lower animals.

Hunters know that in periods when food is scanty game is likewise lean, and breeders, that when plenty of food is supplied the fecundity of their animals is much greater. That the same is true in the human race was distinctly shown by the war. As a result of the extreme distress existing in many wholly barren mountainous districts,

e.g., in the Erzgebirge, the women ceased to menstruate. Cessation of so important a function as the menstruation already points to the presence of considerable disturbance of the function of the female reproductive organs through inadequate nutrition, and since such disturbances are capable, as I showed in my earlier work on old age, of bringing on a premature ageing of the body, inadequacy of nutriment is to be avoided by all possible means.

Thus, the daily diet must be one which is sufficient in amount as well as properly constituted.

III

THE INFLUENCE OF AN IMPROPERLY CONSTITUTED DIET ON THE FEMALE ORGANISM

IF one enters a restaurant where a number of women and girls are eating, one readily observes how irrationally many of them, especially the younger ones, make their selections of food. Pastry and other dainties are the chief articles chosen, and nitrogenous foods are often only to a slight extent or not at all represented.

Yet certain absolutely necessary nutrient salts, such as those of lime and phosphorus, occur in quantity precisely in such nitrogenous articles as eggs and cheese. It is not to be wondered at, therefore, that these women and girls suffer from diseased teeth. We are well aware, from a number of investigations, among which those of Roese deserve special mention, that the teeth deteriorate on a diet lacking in lime.

When the teeth are destroyed, moreover, absorption of the jaw-bone sets in. The bone becomes reduced in size, the face sinks in, and the facial skin becomes loose and forms senile folds.

Consequently lime must be represented in sufficient amount in the daily food intake. Besides

eggs and cheese, milk likewise contains a large quantity of lime, as do also many fruits and vegetables.

In these, including the green vegetables and many kinds of fruit, there occurs also in considerable amounts another mineral substance that is of special importance in the female organism, though contained in largest quantity in the kind of sausage prepared with hog's blood, *viz.*, iron. Where this element is lacking in the diet, there may easily result disturbances of blood formation, chlorosis and anemia, the unfavorable influence of which upon the condition of the tissues and skin, as well as upon the activity of the sex glands, may likewise lead to premature ageing.

Potash is also a very important element, as has been demonstrated of late by the investigations of Urbeanu.[4] This investigator placed animals on a diet very poor in potash, and found that after a time considerable injury to the nerves and muscles, as well as to the outer skin covering, resulted. The animals thus dealt with lost their fur and grew decrepit.

When he later placed them on a mixed diet in which potassium compounds were abundantly represented the fur rapidly grew again.

On the diet lacking in potash there also developed

[4] A. Urbeanu: "Die Gefahren einer an Kaliverbindungen zu armen Ernährungsweise." Wien-Berlin, Urban und Schwarzenberg, 1916.

obesity, which disappeared when a diet rich in this ingredient was given.

In the human subject impaired nutrition likewise results from a diet lacking in potash, and Urbeanu[4] refers in this connection to the baldness and obesity produced in man, and correlates them with a diet deficient in potassium compounds. These conditions in themselves belong among the earliest manifestations of old age. Thus, care must be taken that potassium compounds are ingested daily in sufficient amount.

Such compounds occur in large amount in potatoes, milk, and meat, as also in cereals and in fruits, of which a number are very rich in them, *viz.*, plums, apricots, cherries, grapes, and whortleberries. It should be noted that, according to the researches of Stoklasa,[5] potassium is absolutely indispensable for the tissue interchanges which occur in our bodies.

Likewise indispensable is the daily ingestion of a sufficient amount of the "vitamines." These are nitrogenous, crystalline substances which are absolutely needful for proper activity of the nerves and muscles. Where these substances are wholly lacking in the diet, there result serious disorders, represented in their highest expression by beriberi,

[5] Stoklasa: Hoppe-Seyler's Zeitschr. f. physiol. Chemie, Hft. 1, 62, 1909.

pellagra, and scurvy. I believe I was the first to point out that such conditions may frequently occur among us as a result of a poorly balanced diet, without being recognized.[6]

As a matter of fact, this has since been established as a result of the war diet by a number of investigators who have had many patients under observation. Even before the war, I had occasion to see a number of patients, chiefly women, who, in fear of stomach trouble, had for a long time been living on a poorly balanced diet of grits and porridge, white bread, pastry, hulled rice, and boiled milk. They exhibited a series of nervous, neurasthenic, and hysterical symptoms, together with marked lassitude and muscular weakness.

Most of these patients looked old on account of their muddy complexion and sunken features. Very striking, moreover, were their nervous heart disturbances, such as palpitation, pulse intermittences, and attacks of heart weakness and spasm. In all these cases, recovery or at least amelioration of the symptoms was procured by the administration of a generous, varied diet rich in vitamines.

I have succeeded likewise in cases of actual heart disease in considerably improving the condition, even in serious cardiac cases, by prescribing a diet rich in lime and vitamines, together with ingestion of

[6] Lorand: München. med. Wochenschr., No. 19, 1916.

honey or sugar. Articles of food rich in vitamines include eggs, fresh vegetables and fresh fruits, potatoes, fresh milk, and also bran.

As bran is hard to digest, it must first be properly prepared, as may be satisfactorily accomplished, *e.g.,* by Finkler's procedure.

To obviate loss of the high vitamine content in cereals, potatoes, etc., these have to be cooked with special care. Even before the discovery of the vitamines I called attention to the fact that upon prolonged, unrestrained boiling of foods much of their "living energy" and highly useful substances are destroyed.

Very fresh foods contain the largest amount of vitamines; dried and preserved foods, on the other hand, have little or no vitamine content.

Aside from a sufficient amount of nutrient salts and vitamines, the daily diet must also include a sufficient quantity of fluids, *i.e.,* of water.

IV

THE INFLUENCE OF AN INSUFFICIENT INTAKE OF FLUIDS ON THE FEMALE ORGANISM

MANY women are in the habit of taking too little fluid. Not a few women practically never drink any liquid, not even during meals. As a rule, there is present in these women a condition of weakness of the thyroid gland which we have already described as occurring during, before, or after the climacteric years. In overactivity of the thyroid gland, as in Graves's disease, or in diabetes mellitus, thirst is, on the other hand, one of the characteristic clinical features. There are some women, however, who fail to drink fluid from motives of personal vanity, believing that fluid would make them stout. Now it is certainly not true that drinking water is fattening, otherwise poor people would have long since adopted this device; it is true, however, that if a person eats heartily and drinks much fluid at the same time, a corresponding amount of chyme results and is absorbed into the blood. But if the quantity of fluid taken is insufficient, a correspondingly smaller amount of chyme is dissolved, and digestive disturbances may result.

Inadequate drinking of fluids is also attended with the great disadvantage that the waste-products

set free in the processes of tissue interchange, such as uric acid, cannot be brought into solution and eliminated from the body. These substances then make their way out through the skin surface, meanwhile giving rise to a troublesome eruption over the face and a muddy complexion. The skin of women who never or seldom drink water is, furthermore, very dry and coarse, and as a result of its dryness lines and wrinkles are readily formed. To impart to the skin a smooth, healthy appearance, the body juices which supply it with nutriment must be abundantly present in its tissues, and to this end a sufficient amount of fluid, in the form of drinking water, must be taken.

According to my observations in numerous patients with gall-stones in Carlsbad, the very great majority of them drank water but seldom, previous to the onset of the disease. I also had occasion to note that most of these women had for years been suffering from constipation. This leads, in turn, to stasis of the bile, which favors an inflammatory condition of the biliary passages and thus leads to gall-stone disease. The constipation is thus the underlying cause of this condition, and the former, in turn, is the result of the insufficient intake of fluids.

I had occasion to observe among my patients in Carlsbad that the women who had never or but

seldom drunk water before the treatment were generally troubled with constipation. This fact is also readily understood. The fecal masses in the intestine, in order that they may continue on their downward course, require a sufficient amount of fluid; otherwise condensation of these masses and difficulty at stool are easily induced. Yet there is every reason for women to avoid all influences that might lead to constipation. From the very fact of their different anatomic structure as compared to the male subject and the special physiologic functions of their reproductive organs, women are greatly predisposed to constipation.

There is practically no sort of disturbance in the female sexual sphere which is not accompanied by constipation.

The pride of personal appearance implanted in women with remarkable forethought by nature—rather a virtue in their sex—should forcibly bring to their minds the importance of this question. Nothing is capable of so harming a good complexion and a youthful appearance as constipation persisting for a number of days. The easiest remedy for this condition, on the other hand, is to drink enough water, and in particular to take a glass of fresh, cold water the first thing in the morning. Often this simple measure gives better results than many a purgative drug, over which it possesses, further-

more, the advantage of being a harmless and usefully operating remedy—which certainly cannot be said of purgatives, especially when taken at short intervals.

V

THE INFLUENCE OF UNDULY FREQUENT USE OF PURGATIVES ON THE FEMALE ORGANISM

IN Paris, in the Eighteenth Century, it was the custom of the "dames du monde," compelled to give careful consideration to the maintenance of their good complexions, to have a midwife come to their apartments daily and administer to them a "wholesome" enema. At the present time it would certainly be held rather too much trouble to have the clyster-woman come every day, and besides it would be unnecessary, since with the help of an ingeniously devised apparatus, the enterocleaner, any woman, sitting in a warm bath, can automatically wash out the entire bowel and free it of all stagnant fecal masses. When carried out by a practised hand, this is an entirely acceptable procedure, which, furthermore, is unattended with the disadvantages possessed by most purgatives, *viz.*, that the bowel becomes sluggish thereafter. I have employed this procedure in several of my lady patients in Carlsbad, and observed very good results from it in every instance. It is thus possible for me to recommend a periodic cleaning out of the bowel by this method as a special "intestinal cure."

In young women and girls the procedure is, of course, indicated only where constipation is actually present, but in older women, from about forty years on, it would seem of advantage, especially if there is a tendency to constipation, to carry out the enterocure regularly every week or two. In my book on "Old Age Deferred" I have already emphasized the value of a thorough clearing out of the bowel at least once weekly in the prevention of premature ageing.

In general, however, one can get along without any artificial means of assistance by merely taking care to secure a daily bowel movement with the aid of an appropriate diet yielding plenty of residue material.

The diet in general plays a preëminent part in regulation of the bowel function. A large allowance must be made in it for foods yielding much residue, such as coarse brown bread, graham bread, green vegetables with high cellulose content, fruit and preserves, and marmalade, the sugar content of which also exerts a favorable influence. As already stated, fluids must likewise be taken in sufficient amount. The kinds of food just mentioned have the property, acting either in a direct, mechanical manner through their coarse consistency, or through the fermentative processes set up by them in the intestine, of producing stimulation of the

bowel wall, which is followed, in turn, by contractions and expulsion of the intestinal contents.

There are some women, however, to whom such a diet is distasteful, or whose stomachs, as in many cases of nervousness, will not tolerate such a coarse diet, or again, who want quick results. These resort to purgatives. At first even the milder agents, such as rhubarb, magnesia, tamarind, etc., prove effective, but upon continued use their action in many instances becomes less marked, so that gradually drugs of increasing power have to be resorted to.

Even the enemas which many women administer to themselves lose their effect after a time, as the intestinal nerves and muscles relax in their activity, so that, just as in the case of a refractory horse, one is led to use the whip with increasing vigor, so in these cases drastic purgatives have finally to be resorted to. Such agents, however, contain substances capable, especially if taken rather frequently, of exerting harmful effects on a number of different organs, including the stomach, bowel, liver, kidneys, and even the female reproductive organs.

Even chronic catarrh of the stomach and intestine may result. Thereupon the general state of nutrition of the body suffers, and with it the appearance of the skin surface, in which connection it should be pointed out that frequently only a por-

tion of the intestinal contents is expelled, the remainder giving rise to processes of decomposition and fermentation. It is no wonder, then, if such ladies exhibit a muddy, dark yellowish complexion and find it necessary to remedy it by means of various toilet preparations.

VI

THE INFLUENCE OF COSMETICS

IF many women afflicted, owing to illness or an unwholesome mode of life, with a dull, sickly, yellowish-gray complexion form the habit of introducing a life-like red tint into the "gray monotony" previously existing, we can readily understand the reason for this custom, which is not inexcusable, moreover, when looked at from the human, or more strictly speaking the women's, standpoint.

It cannot but seem incomprehensible and even absurd, however, when young women or even girls, as is now unfortunately increasingly the case, gloss over the healthy and even ruddy complexion which they naturally enjoy with a conspicuous red color and set off their lips with equally unnatural tints.

If this is done with a view to simulating an even more beautiful and youthful appearance, I may assert from the start that the result obtained will be exactly the opposite of the intended illusion.

For any one in his senses and with normally directed tastes will certainly recognize the natural coloring of the face, and will at once suspect any dissimulation, by which he will not be deceived. Not only will he consider that which is unnatural unattractive, but he will likewise involuntarily come

to the conclusion that an attractiveness previously not present has been artificially simulated; whence persons of actual beauty are often really taken to be homely.

And they are also often taken to be older!

For the observer is displeased by that which is strange and unnatural, and when there is a conspicuous red color or pallor on the face in combination with lips that glow with an impossible red hue, man's powers of age appreciation are misled and young women and girls are considered to be older than they really are.

On the other hand, it cannot be denied that ladies already of a certain age may often succeed by a very sparing application of "rouge" over a sallow, sickly-pale, faded face in reducing their apparent age by ten years. The result of "painting" in the old and the young is thus that the old frequently are made to look younger but the young invariably to look older.

Rapid ageing, as far as the facial appearance is concerned, will, furthermore, actually set in on account of the severe injury done to it by "painting."

Two factors should be emphasized in this connection, *viz.*, mechanical and chemical influences, as the causes of injury to the skin of the face.

Regarding the first of these factors, I have pointed out in the latest edition of my work on

"Old Age Deferred," in the chapter entitled "A Few Hints on Youthful Appearance," that in the rubbing of pastes and other preparations over the facial skin, lines, wrinkles, and folds are produced in a mechanical way. Injury due to chemical causes may result from the fact that the cosmetics used often contain harmful ingredients, such as lead, and in Carlsbad I have in not a few instances had occasion to treat cases of liver and intestinal disorders to which the lead content of such beautifying preparations bore a causal relationship. It should be borne in mind, further, that such paints and thick pastes block up the pores of the sweat and sebaceous glands, upon the free functioning of which the appearance of the skin of the face in large measure depends. From my own experience I do not know of a single case in which the healthy appearance of the complexion was not impaired by "painting," and I need merely refer in this connection to the facial aspect of women who, like actresses and others similarly engaged, are well-known to paint themselves up almost daily and quite often are compelled to pay for this practice with a prematurely aged appearance.

In contending against that which is natural, man is always worsted; nature never allows one to trespass on her fields with impunity, and takes bitter revenge for any such attempted encroachment.

VII

THE INFLUENCE OF ANTICONCEPTIONAL PRACTICES

IN the first part of this book, mention was made of the admirable foresight with which nature provides for everything that is connected with the preservation of the human race and its procreation as well as of the severe punishment she metes upon all irregularities and abuses committed in this respect.

The fact was also shown, that from such abuses and especially from abortive and anticonceptional practices even premature death may result.

I would like to add here that early and rapid ageing may also be produced through anticonceptional practices. Even in the male subject, such preventive habits may contribute to early ageing, but in women its effects are far more deleterious. This is due to the different anatomical arrangement and structure of the female organs as well as their different physiological functions, which are far more complicated than in the male. Indeed, in this respect nature has placed a far heavier burden upon woman than upon man.

Each gland in our body is intended for a special purpose and for a certain kind of activity. This

general rule also holds good as regards the sexual glands. To insure their activity, nature has implanted a kind of craving into the breast of each creature, which demands satisfaction. There are certain persons who, through a special kind of education in preparation for a certain vocation, can more or less successfully resist this craving, but most people show manifestations of nervous disorders from an enforced total sexual abstinence of long duration, especially women who have arrived at the mature years of maternity, often without any knowledge of the real cause of these disorders.

I have for this reason advocated marriage as a preventive of such disturbances and as means of lengthening life.

Still more serious, however, are the consequences for those who, while actually sipping of the nectar, resort to anticonceptional measures with the purpose of thwarting the natural consequences of the satisfaction of this peremptory craving. Serious disorders of the reproductive organs and of the nervous system result from such practices. Women are exceedingly sensitive to all disturbances that arise at this, their most vulnerable point, the organ of sex.

While it is true, as the great, much travelled Belgian physician and nature student of the seventeenth century, Van Helmont, emphasized, that

women are what they are by reason of their sex organs, it must be considered likewise a fact, according to my conviction, that women are susceptible to rapid ageing on account of these same organs, or at least, to ageing much more rapidly than men.

As I have proved in my various publications, ageing is brought about by changes in the ductless glands, among which the thyroid and the sex glands play the most important physiologic rôle. Like the thyroid, the ovaries exert an influence over a number of the most important bodily functions, such as blood formation, the heart action (disturbances of heart action during the period of the menopause), and in particular, general metabolism. Thus, obesity often sets in after cessation of the function of the ovaries at the menopause or when these organs are removed by operation.

In my book, "Building Human Intelligence," I show at length how the brain, and likewise the general condition of the nervous system, is influenced by these glands. The effects of these remarkable organs extend even to the appearance of the skin, and the experienced eye is often able to recognize the presence of disorders of the ovaries and uterus merely from the dirty-yellow, muddy complexion of the women suffering from them. Similarly, when these organs are overactive, the condition betrays

itself in a bloated, sallow, aged, and worn appearance of the face.

In view of the above mentioned influence of these organs on a number of important bodily functions, one can readily understand why anticonceptional practices may likewise cause rapid ageing by acting harmfully on the organs of sex.

The harmful effects referred to are two in number: The first is a physical excitation and irritation of the sex organs which is not followed by satisfaction, or only partly so. The second is the mechanical irritation of the sexual organs by the devices employed for the purpose referred to.

The first of these harmful influences is exerted when, for example, a covering over the intromittent organ is used. In this respect there can of course be no question of mechanical irritation, but its use prevents complete satisfaction or permits of it only in part. Where pessaries are used, the satisfaction obtained may be greater—although even under these conditions it is not complete—but the mechanical action on the uterus may induce severe disorders of the latter, or at least pave the way to their occurrence. The use of sponges likewise interferes with complete satisfaction, and may also lead to uterine disturbances. The premature interruption of the sexual act is not in itself attended with any mechanical local injury, but does produce,

owing to the complete lack of satisfaction, a correspondingly pronounced injury to the nervous system, and is often the cause of neurasthenia and hysteria, with frequent disturbances of heart action.

Either of the above practices may lead more or less readily to neurasthenia or hysteria merely through the impossibility of obtaining complete satisfaction as well as through irritation of the nervous system.

These, in turn, result in a very marked predisposition to the development of arteriosclerosis, which easily becomes established under such circumstances.

Furthermore, these practices bring about severe disorders of the uterus and ovaries and likewise frequently afford the initial impulse in the development of cancer of the uterus.

It should be borne in mind, too, that in all these procedures there occurs a marked congestion of the uterus and ovaries with blood, and when this takes place frequently, the result is an inflammation of these organs as well as of the neighboring tissues, with consequent endo-, peri-, and parametritis, and as a further consequence, the production of exudates.

One can readily understand that such disorders as these, which continue for years, greatly undermine the women thus afflicted and cause them to age rapidly. It is also plain that the diseased

ovaries become incapable of carrying on any longer their important rôle as one of the glandular organs presiding over blood formation, the metabolic processes, and other vital functions, and that consequently rapid ageing takes place in women suffering from inflammation of the ovaries. Such ageing will occur even more quickly if, as is unfortunately often the case, surgical removal of the diseased uterus and ovaries is required on account of these disorders, and their activity in consequence completely ceases.

I would also like to emphasize the fact that premature interruption of the sexual act, although it causes in itself no local injury to the organ of sex and is considered harmless by many women, may nevertheless cause not only pronounced nervous injury, but also, by reason of the frequent overcongestion of the uterus, favor the occurrence of an extremely serious disease, *viz.*, cancer. Thus, Kisch[7] noted as a consequence of this practice the formation of cysts at the uterine cervix, and in these cysts rather frequently a cancerous degeneration. Furthermore, Neubauer and Pigeolet already emphasized years ago that the onset of cancer may be favored by the use of condoms. I would like to stress also the fact that the use of pessaries may likewise promote tumor development.

[7] Kisch: Jahrschr. f. d. Sexualwiss., 1916.

Very often local injuries to the uterine tissues produced under these circumstances cannot well be obviated. Yet through such injuries of the epithelium, especially if they occur rather frequently or, as it were, habitually, cancer formation is readily promoted, especially when added unfavorable influences, such as heredity (cancer in the family), late adult life, etc., are present as contributory factors.

It is known that cancer in general readily develops where such frequent injuries of the covering epithelium are taking place, as is illustrated in the cancer of the stomach following a coarse diet in peasants, cancer of the lips in pipe smokers, and cancer of the mammary gland after injury. We know also that the uterus is a preferred site for cancer, and the repeated irritations and injuries previously mentioned certainly constitute a circumstance favorable to the frequent development of cancer in this organ; the frequent overfilling with blood and inflammations following the use of anticonceptional measures may likewise contribute to this end.

The question thus naturally arises whether it is worth while to expose oneself to such great risks, to acquire such serious diseases, to endure pain and torment for years, and in addition to age rapidly, merely in order to avoid being blessed with a fam-

ily. If material cares constitute the motive for so doing, it would be well to bear in mind that the expense of an illness of years' duration may easily outweigh that of rearing a child, not to mention the prolonged suffering and pain and the prospect of rapid fading and ageing which must be taken into account, and in addition the risk of premature death.

If, however, it should be the pride of personal appearance which deters so many women from a possible pregnancy, then I would offer the objection that very often the charms of a woman are further enhanced after the birth of a child, as is shown, indeed, in the pictures of the great Italian masters and in those of Rubens.

Often faded maidens of the type known among the Walloons of Belgium as "vierges martyres," after marriage and the birth of a child literally blossom out. Married life, pregnancy, and lactation—if the latter is not continued for an excessive time—act, indeed, like a kind of whip upon an inactive thyroid gland and inactive ovaries, which are stimulated to greater activity, the functions presided over by them being, in turn, improved. Thus in many instances it would be desirable even from the standpoint of personal beauty for a woman to have a child.

As for the relationship of material cares to the

rearing of a family, the State might wisely step in and assist, especially in the countries recently deprived of so many of their sons through war. In order to increase the number of births, families comprising more than five children, unless well-to-do, should be exempted from taxes; for each child born after the third or fourth, moreover, fathers of poor families might be paid a contribution or, instead, such children reared at the expense of the State.

There remains to be settled the question as to what to do where bodily infirmities of the women make it appear that pregnancy and labor would be dangerous to life. I have already suggested that before contracting marriage each man and woman should be subjected to a physical and mental examination in order to ascertain their fitness for matrimony and whether they harbor any transmissible disease.

In any case it would be desirable for women to call in their family physician in council before they enter upon any such practices as expose their health and even their lives to great risks. This, of all places, is the one in which to emphasize the fact that the physician may be of the greatest utility, not so much in treating as in warding off disease. The blame for the latter lies not with the physician, but the patient. Being frequently called in too late, he is often given to treat an organ which

has already been destroyed by disease. He is summoned to put out the fire when the house has already burned down. And yet no great conflagration breaks out suddenly. At first it is only a spark, then it slowly spreads, but by the time the cry of "Fire" is uttered a part of the house has already been destroyed. Similarly a disease almost never develops all at once. Often it extends imperceptibly and insidiously, and by the time it is obvious the patient is often irretrievably lost, or at all events the disease is no longer curable.

If I may be allowed to express a conclusion drawn from personal observations extending over many years, it is that thousands upon thousands of men and women go through life without being aware that they are ill and often severely ill. This is a matter of daily observation to the physicians of insurance companies. And from this there naturally springs the thought that the State should carry out yearly an official examination of every man, woman and child—including uranalysis—in order to ascertain if they are in good health. What a multitude of human lives could thus be saved betimes, and likewise what immense sums of money for hospitals—and no less for insane asylums!

May the above lines be dedicated to the practical consummation of this suggestion!

PART III

On Rejuvenation

INTRODUCTION

TO PART III

IN the first two parts of this book I showed how early decay and loss of life can be brought about by reckless habits. In the following, third part, I make bold to present the means for remedying the consequences of such disastrous habits, and to describe how we may rejuvenate not only those who have brought premature old age upon themselves through their own faults, but also those persons who, by reason of the inexorable laws of nature, suffer from the infirmities of normal old age.

Some years ago I showed in my book, "Old Age Deferred," that by a rational mode of living and the use of glandular extracts rejuvenation could be brought about, and herein I am adding my recent experiences and observations in this direction, together with several new measures of great efficacy, among them the surgical methods of the widely known physiologist, Steinach, which, in animals especially, have given such sensational results.

I must apologize to my readers if, perhaps, I quote too often my earlier works entitled "Old Age Deferred" and "Building Human Intelligence." I would have far exceeded the intended limits of this

book had I introduced in it again the many proofs and items of evidence upon which my findings and assertions are based; nothing remains for me, therefore, but to refer the reader to the above mentioned books.

Those who have read my other works will readily believe me when I say that it is not to flatter human vanity that I have undertaken to write these lines. I can fully appreciate, however, that every person wants to appear at his best, a favorable appearance being a great advantage in this hard struggle for existence.

Having been the earliest writer on the prophylaxis and treatment of old age as a preventable chronic disease, it is but natural that I should desire here to present the newest procedures and proffer my opinion concerning those best adapted for attaining the aim referred to, as well as for prolonging the working capacity and bodily and mental vigor of aged persons, at the same time showing the best methods by which these can be regained if they have been lost.

Aged persons are very often potentially able to render the best services to human society and often constitute its most useful members. These men or women often dispose of some of the choicest gifts of the intellect, which can be obtained neither by study, industry, nor by any kind of endeavor, but

solely by age, *i.e.*, an extensive experience. They are invaluable as teachers, and as directors and managers of institutions for the public good. In the administration of large business firms such men or women can be immensely useful by placing wholesome restraint, with their wisdom gained by experience, upon the often risky and hazardous undertakings of their younger associates.

To try to conserve the lives of persons of such value, and to keep them in good working condition as long as possible, is really worth all our efforts!

I

GENERAL CONSIDERATIONS ON THE POSSIBILITY OF REJUVENATION

OVER thirty years ago the possibility of making a younger person out of an old man or woman was positively proved. Already at that time photographs were published in the medical journals by Sir Victor Horsley, George Murray, and others, illustrating aged men and women who, after treatment by animal extracts, appeared much younger than their actual age. These persons were suffering from a diseased condition of the thyroid gland, myxedema, and upon giving them extracts of the thyroid glands of sheep, men and women of sixty or sixty-one were caused to appear as if they were fifty and in some cases forty-five or even less.

Upon reading these reports and studying similar cases personally, I was led to the thought that if a man or woman suffering from disease and sixty years old can be made to look much younger by means of a certain remedy, then other men or women, who are not suffering from the same disease, or not to the same extent, might likewise profit from such treatment and be made to look younger. Having tried this treatment, first upon

myself and then on patients, I found, indeed, that my supposition had been correct.

The results of my observations were published in my book, "Old Age Deferred," in which are described cases which, upon treatment with extracts from the glands of animals, mainly sheep and hogs, appear younger to the extent of ten, fifteen and sometimes even twenty years. This book was based upon a communication on the causes of old age which I had presented before the Biological Society of Paris six years before. In this communication[1] I showed that old age presents all or nearly all of the symptoms of a degenerated condition of the thyroid, *i.e.,* that it is like a myxedematous condition.

The different noxious agencies to which we expose ourselves willingly or against our will, most of them mentioned in the first two parts of this book, are also known to be very deleterious to the different ductless glands of our body, *viz.,* the thyroid, the sexual glands, etc., which govern all its vital functions. When these glands are attacked and caused to degenerate, a diseased condition results, the symptoms of which correspond to those of old age.

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[1] Sur les causes de la Sénilité. Comptes-Rendus de la Société de Biologie, Dec. 4, 1904.

Possibility of Rejuvenation

In previous experiments[2] carried out with the collaboration of Prof. Minkowsky, in the laboratory of the Augusta Hospital in Cologne, I had shown that these different glands form a kind of a chain, so that removal of one of them, *e.g.,* the pancreas, would result in transformation of other glands, *e.g.,* the thyroid gland. Thus it will be readily understood that noxious agencies attacking one of the glands, such as the thyroid or the sexual glands, will also react upon the other glands and lead to their degeneration.

In my communication to the Paris Biological Society on the causes of old age, I showed that old age is due to the degeneration of the different ductless glands, and recommended treatment of old age with extracts from the ductless glands of animals. That such treatment is really possible is shown clearly in my book, "Old Age Deferred," in which I not only describe the good results obtained by treatment with animal extracts, but also point out the fact that through hygienic procedures and by certain forms of diet, the vitality and activity of the ductless glands, *e.g.,* the thyroid and sexual and other glands, can be enhanced.

Years before me the famous French savant, Brown-Séquard, born of an American father and French mother on the island of Mauritius, and for

[2] Communicated to the Paris Biological Society, April 25, 1909.

several years Professor at Harvard University, had shown by experiments on himself that a kind of rejuvenation, in the sense of an improvement of certain symptoms of old age, is possible. He employed extracts made from the crushed testicles of animals.

A few years ago a professor of physiology, Steinach, producing enforced activity or irritation of the sexual glands by surgical procedures, actually proved by experiments on rats and on man that a kind of rejuvenation is possible. The first symptoms of this change show themselves within a few weeks after the operation.

All these different methods, however, are based on one and the same means of producing rejuvenation, the one I described before the Paris Biological Society nearly two decades ago.

At that time I said that old age is due not alone to degeneration of the thyroid or the sexual glands, but to that of all the glands. It may start from a degenerated condition of one of the glands, *e.g.*, the sexual glands or the thyroid, but afterwards, since all these glands form a chain, changes in one of them will produce similar changes in the other glands, and old age, with all its symptoms, will result.

The experiments of Steinach clearly prove the correctness of my theory as to the origin of old age.

His experiments show plainly that when a condition of overactivity of the sexual glands is produced the other glands are influenced also and that the rejuvenation he procures is due, not only to the excitation of the sexual glands, but to that of all the other glands.

Indeed, the late assistant of Prof. Steinach, Dr. Schleidt, examined microscopically not only the testicles of the old rats that had been made over into young rats, but also the thyroid gland and another endocrin gland in the brain—the hypophysis—and he found these glands in the previously old rats in quite a youthful and perfectly normal condition. Thus, we are certainly justified in concluding that rejuvenation is the result of an improved condition, not only of one, but of all the endocrin glands.

All that one has to do to rejuvenate a person, is, consequently, to overcome the aged and degenerated condition of the endocrin glands. This can be done in one of two different ways: (1) By a surgical procedure, as shown by Prof. Steinach. This, however, has the disadvantage that, while not efficacious in every case, it exposes sometimes, in addition, to deleterious consequences. (2) By internal methods, *i.e.,* by ingestion of the extracts of different glands.

Aside from these procedures, we can obtain still

better results, according to my experiences and observations in the last ten months, by employing the ultraviolet rays of natural or artificial sunlight (quartz light), which act as activators and powerful stimulants of the endocrin glands, especially if these glands are taken by mouth at the same time. Radium baths and certain kinds of mud baths of high radium content are also capable of bringing about rejuvenation. In addition there are available certain hygienic procedures, such as abundant perspiration and purging, as I show in my book, "Old Age Deferred."

II

REJUVENATION OF MAN AND ANIMALS BY SURGICAL METHODS

BY cutting through the excretory ducts of the sexual glands at a certain point in a number of old marasmic rats of the age of twenty-eight to thirty months—an age corresponding in rat life to the eighties or more in human subjects—Prof. Steinach[3] was able to observe several weeks afterwards an amazing change for the better in their condition. Indeed, the old rats thus dealt with had become transformed into young rats.

Before the operation, rendered listless by their great age, these old rats would sit lazily for hours in their cage, scarcely making any movement, and showing no signs of interest whatever in their surroundings. Even a piece of fat bacon passed into their cage on a stick, a morsel most highly attractive to rats, failed to induce them to make any effort to attain it by creeping up the stick.

After the operation a radical change from their apathetic behavior was seen within a few weeks. They became extremely lively in their movements,

[3] Steinach: Verjungung durch experimentelle Neubelebung der alternden Pubertätsdrüse, Berlin, 1920.

and their interest was evoked by any object passed into their cage, which they sniffed at at once and examined with the greatest curiosity.

When two male rats are brought together in a cage, a bitter fight invariably follows. Before the operation, an old rat placed in the cage of a young rat would invariably show the white feather at once, making every attempt to get away and showing no fighting spirit. After the operation, however, he would take up the challenge at once and prove himself a valiant contender.

Even in their external appearance the operated rats clearly showed a remarkable rejuvenation. Before the operation they seemed bent with age, with sagging heads and very thin bodies, merely skin and bones. Their furry coat showed many large bald patches. As Steinach demonstrated with his photographs, however, these same old rats underwent a miraculous change in their external appearance some weeks after the operation. New hair grew all over their bodies, in fact they now exhibited a rich, glossy and complete coat, the bald patches having entirely disappeared. At the same time they were as agile and erect as young rats in the prime of life, with well rounded forms.

Their behavior in the sexual sphere after the operation was equally remarkable, a most striking change taking place in this respect in these old

rats. Before the operation all sexual proclivities seemed to have been completely lost. A young female rat placed in their cage evoked no interest whatever. If some few of them did show a trace of sexual desire, it was of no avail, for they were quite unable to carry out the sexual act.

After the operation, however, these previously impotent old rats turned into sexually active young males. Young female rats put into their cage several weeks after the operation proved highly attractive, the transformed old rats giving every evidence of a surprising sexual capacity and insatiable desire, their activity in this direction being such as would seem impossible, or at any rate abnormal, even in vigorous young rats!

As Steinach describes it, there occurred a condition of "sexual paroxysm" in his operated rats. These, in their passion, made no distinction as to whether the females pursued by them were or were not in the mating period, a rather rare occurrence among rats.

The young generated by those of the old rats which had been operated on one side only were normal and vigorous, so that Steinach was able to use them successfully for breeding purposes.

Not only did these old rats again become young, but their normal span of life was prolonged by the operation. Ordinarily rats live, according to

Steinach, only twenty-eight or at most thirty months. These rejuvenated rats, however, lived about eight months longer. For human beings this would mean that life could be prolonged by about 25 per cent. Thus, it would seem possible in this way, if one were permitted to apply these findings to the human race, to add about twenty years to the life of a man already about eighty years old.

It may now be of interest to take up the question as to how this remarkable rejuvenation and prolongation of the average life period of rats was produced in Steinach's experiments. Upon cutting through the ducts of the seminal glands at a certain level, care being taken not to injure the vessels which supply the testicles with blood, degeneration of the seminal glands follows.

As is well known, there are two main parts in the testicles: (1) That serving the purposes of external secretion, and which relates to the seminiferous tubules, and (2) a far more important part, that serving the purposes of internal secretion. The latter contains the so-called cells of Leydig. This portion governs some of the most important functions of the body, and also powerfully influences the whole nervous system and the qualities of the mind and soul.

Even the external appearance of the body and the condition of the skin and all tissues are

dependent upon these remarkable glandular structures, as also upon the thyroid.

Upon cutting through the excretory ducts of the seminal glands, these glands and the seminal cells undergo degeneration. But in conformity with the law concerning the intimate connections between the different endocrin glands above mentioned, the portion of the testicles which serves the purposes of internal secretion thereupon becomes hypertrophied, with the formation of new cells in great numbers, as Steinach proves by microscopical sections.

It is but natural that in consequence of this the functions and tissues governed by these cells should improve. Thus, new hair grows on the previously bald areas and the previously skinny limbs become rounder, the muscles having undergone development, especially since these animals, quite bereft of appetite in their previous aged condition, become voracious again. Of course, even their renovated condition did not save these animals from ultimately paying their tribute to the eternal laws of nature. Although, thanks to the genius of Steinach, a considerable prolongation of their lives had occurred they eventually died, without any apparent disease, Steinach attributing their death to changes in the condition of the brain.

When the organs of these animals were examined

after death the different tissues were found, strange to state, in the same condition as might have been expected in young animals. As Steinach showed in his illustrations, both the macroscopic and microscopic aspects of the genital apparatus, with all its internal and external organs, exhibited the same condition as might be found in healthy and vigorous young rats.

This suggests the case of the famous English peasant, Thomas Parr, who, having died at an age exceeding one hundred and fifty years, likewise showed at the autopsy—performed by the great Dr. Harvey, to whom we owe our earliest definite knowledge of the circulation of the blood—a perfect condition of his tissues and organs, including the testicles. The fact that he was condemned when over one hundred years of age for unseemly conduct with a young girl of eighteen years would appear to substantiate the statements of Harvey.

With reference to the ingenious experiments of Steinach, causing retention of the seminal fluid, I should like here to mention the fact that already about 1500 years ago the great Hindu physician, Dhanwantarid, recommended, in his book "Sushrut"—written in the Sanskrit language—retention of the semen through an abstinent life as a means of enhancing the strength of the body and mind. Indeed, such a belief is even now popular among

the Hindu races in India, and is based, moreover, on the precepts of their religion, for it is also contained in one of the volumes of the "Sacred Books of the East," edited by the great orientalist, Prof. Max Muller, of the University of Oxford.

Prof. Steinach, in the course of his experiments, obtained striking results in female rats, similar to those witnessed in males. He transplanted the ovaries of young, vigorous rats into old, decrepit females, and the same remarkable effects appeared as have already been described. Here again, the most astounding changes were produced in the sexual sphere. Before this transformation, produced by the operation, the old female rats were, of course, of no value for breeding purposes.

When an aged (28 months) female rat was placed in the cage of a young male, he at once approached, but having satisfied his curiosity by inspecting her, he simply turned about and took no further notice of her. How different, however, was his attitude when the same old female was placed in his cage after her rejuvenation! He at once began to pay ardent court to her, and remarkable to relate, the old rat became pregnant a few weeks later. The previously atrophied and scarcely recognizable mammary organs became red and turgescent, and the pregnant animal built her nest. After a pregnancy of twenty-three days'

duration, five, and in another instance, nine, infant rats were born!

Fancy a grandmother of eighty years having children again, and splendid, vigorous children at that! Indeed, the old rat, after being sterile for ten months in consequence of advanced age, had given rise to offspring that were, as Steinach puts it, "ungewöhnlich kräftig" (unusually robust), and at the same time the old mother had an abundance of milk and fed her offspring in the normal manner. The condition of these young from a very old mother six weeks later is characterized by Steinach as "besonders gross und kräftig gewachsen," (grown exceedingly large and robust), and he later used them for breeding purposes.

It is interesting to note that at the autopsy of these rejuvenated old rats the sexual organs, including the ovaries, mammary glands, and uterus, were found in the same condition as would have been expected in young rats.

Thus, upon transplantation of the ovaries of young rats into old ones, the new ovaries made up for the lost functions of the former ovaries which had undergone degeneration by reason of advanced age. Along with this came the remarkable transformation into a young animal, with all the attributes of a young female, again proving the truth of what the great Belgian physician, Jean Batiste

Helmont, said several centuries ago, *viz.*, that a woman is made what she is by her ovaries.

At the suggestion of Steinach, Lichtenstern performed the same operation upon several human male subjects suffering from disease of the testicles or of the prostatic gland. These men likewise showed the symptoms of advanced old age, although one of them was but forty-four years old. Even young persons may show symptoms of old age in consequence of disease of the sexual glands. These men had no sexual proclivities whatsoever, and were completely impotent.

After section of the seminal ducts, marked improvement occurred within a few months. The wrinkles in the face of one of them, a man of forty-four years showing premature old age before the operation, disappeared, and in each of the three cases described in Steinach's monograph, muscular strength was considerably increased. These persons felt much younger than their age; their fatigued state disappeared. Their symptoms of arteriosclerosis, dizziness, shortness of breath, tremor, etc., also disappeared or were improved. Their impotence was also improved, though not to the extent observed in the rats, as could naturally not have been expected. The sexual desire reappeared and was very pronounced. Potency was restored to the normal of their younger years in at least

two of the three cases, and in the third, a man of seventy-two years with pronounced arteriosclerosis, sexual desire reappeared after a long interval, and natural satisfaction of it was possible.

As in the rats, too, the mental condition was much improved, especially the memory, thus proving the correctness of my observations on the influence of the sexual glands upon mentality and memory, discussed in my book on "Building Human Intelligence." It is interesting to note, also, that in each of these three men the hair grew more abundantly after the operation.

There are, however, certain drawbacks to the surgical treatment of old age. At the last Congress of the German Naturalists and Physicians in Nauheim, in September, 1920, the surgeons Prof. Payr, of Leipzig, and Prof. Kümmel, of Hamburg, uttered a serious warning against the performance of these operations, on account of the severe dangers that might follow. As Payr maintains, serious shock might result from cutting through the seminal ducts, and Kümmel even cited cases of death that had followed such an operation.

Similarly, the surgical methods of Voronoff, intended to produce rejuvenation through transplantation of the thyroid, are not free of danger. At the same time, insofar as I am aware, this method cannot boast of the wonderful results ob-

tained by the ingenious Steinach. Besides, it is an antiquated procedure, and one long since given up, to transplant the thyroid or the ovaries in order to secure their secretion into the body when the actual organs of the bearer have degenerated.

It has been proved by strict and convincing scientific methods and by observations kept up for years that through ingestion of the extracts of the corresponding glands from healthy, vigorous animals results similar to those of operative transplantation can be obtained.

Accordingly, I believe it more rational to give preference, at least in the treatment of human beings, to the ingestion of fresh animal extracts by the mouth. Sometimes it may take a few weeks longer, at least in human subjects, for rejuvenation to take place, but at all events this method is a far safer one than the operative procedure.

III

REJUVENATION BY THE INGESTION OF ANIMAL GLAND PREPARATIONS

OLD age being caused by degeneration of the endocrin glands, especially the thyroid and sexual glands, all that is necessary to secure rejuvenation is to improve the condition of these glands. The best and easiest way to do this is to administer by the mouth extracts of these glands, after their extirpation from healthy animals. As long as thirty or more years ago it was proved that when one of these glands, such as the thyroid, is degenerated, all of the normal functions of this gland can be reproduced by ingesting extracts of the thyroid of sheep. The diseased gland is thus successfully replaced by the ingestion of the animal gland.

To bring about rejuvenation I have given to old men and women, and also to persons suffering from premature old age, extracts of the thyroid and sexual glands of animals. As already mentioned, marked success attended the procedure. The persons treated looked considerably younger after it, to the extent of ten or fifteen years and sometimes even more. The wrinkles in the face already be-

gan to disappear four or five weeks after the treatment, and at the same time, previously corpulent persons, losing their excess of fat, were made to look slender, thus imparting a youthful impression.

That thyroid treatment causes a considerable loss of fat is a well known fact. At the same time, the different functions previously impaired owing to old age became more normal again. The marked muscular lassitude disappeared, and the movements became more agile. The pulse, previously slow, as it often is in aged persons, became more rapid. Indeed, for cases of very slow pulse, or bradycardia, a condition frequently met with in the more advanced cases of arteriosclerosis, I have recently seen very good results from the administration of thyroid extracts.

The circulation of the blood being improved by the gland treatment, aged persons previously complaining of cold feet and hands obtained improvement in this respect.

The kidneys, previously sluggish, also showed an amelioration of their functions, the output of urine being augmented, and the uric acid, sodium chloride, and other substances, previously retained in the body, better eliminated. The intestinal functions were likewise improved, and bowel action became more regular.

In the books mentioned above, I have given the

full details as to the results of such treatment. Since their publication some years ago I have obtained rejuvenation in many additional cases, and according to my observations the results are comparable to those which Steinach produced in men through his operative procedure. Thus, as in the case of the operative procedure, the condition of the hair was much improved by the treatment. But already thirty years ago, in the photographs that were published illustrating the cases successfully treated by thyroid gland, previously bald persons were shown with a new growth of hair on their heads.

There was likewise marked improvement in the sexual functions. While not equivalent to those obtained in Steinach's old rats, the results were not far behind those brought about by his procedure in male human subjects. Indeed, it is not feasible to draw inferences from rats to men, the difference between man and these rodents being far too great. Such an attempt would be just as ill-advised as trying to make a comparison between the sexual desires of an overworked Wall Street business man and those of members of the native tribes of Central Africa or Australia, living in the full liberty of nature.

In general, there exists a certain antagonism between an overworked brain and sexual activity.

There can also be no doubt but that impotency is in very many cases merely of psychic origin, complete integrity of the sexual organs existing at the time. Very often this condition is only a fictitious one, and many men are impotent merely because they think they are. And so it is also easy to understand that in many cases the rational treatment of a neurasthenic or hysterical condition can bring back sexual desire, and even potency that had been lost some time before.

At all events, whether it be through the favorable influence on the mind and mental condition in general or through a direct influence upon the sexual glands and the thyroid, which, as is well known, are functionally coöperative, I was able to note both in men and women a marked effect upon the sexual activity after the combined treatment with extracts of the thyroid and sexual glands. In men the sexual desire, sometimes lacking for a long period, reappeared in most cases, and potency improved.

In women the results obtained were even better than in men. I frequently learned from the husbands of women who had shown evidences of sexual frigidity or of marked diminution of the normal sexual desire that this condition had much improved after their wives had been taking ovarian extracts for a certain length of time.

That such treatment must exert a very distinct influence upon sexual activity in women is best shown by the fact that in girls and women who had ceased to menstruate for months on account of certain diseased conditions the menses reappeared after ovarian treatment, especially where thyroid gland was simultaneously taken.

I am inclined to believe, from observations I have made, that such treatment, especially if combined with the administration of iron, arsenic, and mud baths, constitutes the best means for dealing with sterility in women. I must here add that the rejuvenation treatment has, in general, given me better results in women than in men. The reason for this is that the ovarian extracts I used were superior to the extracts obtained from the male sexual glands of animals. It seems to be easier to prepare very active female than male extracts. The female extracts contain the most active portion of the ovaries, the lutein cells, which portion constitutes the internal secretion of the ovaries. Such preparations are more easily obtained than those of male animals which contain the cells concerned with internal secretion, the cells of Leydig.

One may ascribe to stimulation of the sexual glands and the thyroid the fact that among the different evidences of rejuvenation there occurred a

marked increase of mental activity, as in Steinach's experiments. I have already mentioned such effects in my book on the treatment of old age, and those who have read my work on the improvement of the human intellect through hygienic and therapeutic measures will have noted, in the chapter on the influence of the sexual glands upon the intellect, the close relations existing between the two.

Nearly all the great men of present and past times, including great writers, artists, famous generals, etc., have had highly developed sexual proclivities. Their high-grade intellect offers an enormous contrast to the inferior mental qualities and feeble intellect of castrates.

Steinach particularly mentions how his operated rats emerged from their apathetic state and began to evince curiosity as to every object passed into their cages. Likewise, the men who were operated on by Lichtenstern showed a marked improvement in mentality, and especially a better memory—a fact upon which I have also laid stress in the books above mentioned, and in particular in a work I have just written, on poor memory and the means of improving it. Even the earliest writers on the subject made note of the fact that they had observed a marked influence of thyroid treatment on the memory.

The favorable effects of the combined thyroid

and sexual gland treatment on the mind were also clearly evidenced by a fact I often had occasion to observe, *viz.*, that persons of despondent mood and pessimistic disposition showed a marked change in this respect after some weeks' treatment, becoming more cheerful and lively, and looking at things from a more favorable viewpoint.

Having obtained such good results from internal treatment by the ingestion of animal glands, it is not possible for me to recommend attempts at rejuvenation by surgical methods. Not only are such methods not free from risk, but lately it has been found that the results are not always to be depended on, for in some cases the operation has been without avail.

Hitherto it has been a general rule in therapeutics to undertake operations in "internal" diseases only in cases where internal treatment does not present a favorable outlook. This is certainly not the case here. In any event, the wisest plan would be, I think, to try internal treatment first, and then proceed to operative intervention only if the internal treatment fails to yield satisfactory results, using good preparations and at the same time living a hygienic life, with avoidance of such agents as might counteract the effects of the thyroid and sexual glands, such as alcohol, abuse of tobacco, strong coffee or tea, etc. I am of the opinion that

good results will nearly always follow the glandular treatment.

But even after rejuvenation has been obtained by operation, such a hygienic mode of life as I have recommended must be strictly maintained if one wants to profit fully and for a long time from the results of Steinach's operative procedure. Rats do not, we may note, drink alcohol nor smoke, and if such operated persons will fall back into their old habits, they may not enjoy the results of the operation very long. At the same time, it would seem very rational for such operated persons to ingest animal thyroid and sexual gland extracts in order to prevent recurrent decay of these glands.

With reference to what has been said above, there may be some of my readers who will object that thyroid treatment may itself present certain dangers. Such a remark would not have been wholly unjustified if it had been made about twenty-eight or thirty years ago, but at the present time it must be considered thoroughly unfounded and obsolete.

We have learned much since then, and through the treatment of so many hundreds of cases our knowledge and experience have been enriched by many facts of which we were then quite ignorant. Above all, we now dispose of far better preparations as compared to the primitive and sometimes poisonous ones then in use.

Again, we now know what selections must be made from among the patients themselves before they are subjected to such treatment. I present full details on these points and as to how to carry out such a treatment in my book on "Old Age Deferred," laying special stress upon the necessity of great caution in cases of heart disorder.

I must here add, however, that at the last Congress on Diseases of Nutrition at Homburg in September of last year, Prof. Lichtwitz advocated the use of thyroid even in heart cases, on the basis of his observations, providing certain special precautions were used. At the same Congress Prof. Strauss recommended that one should use only the thyroids of well nourished animals.

At the same Congress Prof. von Noorden mentioned, in the discussion following the address on internal secretions by Prof. Biedl, of Prague, the fact that, following my example, he had also treated several cases of aged persons with thyroid gland, observing a rejuvenation similar to that described by me in "Old Age Deferred." Some time previously he had made the same statement in his "Handbook on Dietetics," published with the collaboration of Prof. Salomon, of Vienna.

I have treated several hundred persons with thyroid extracts, and have taken them myself, and have never seen any disagreeable symptoms fol-

lowing their use. It is true, however, that I have selected my patients very carefully. Diabetic persons or those suffering from Graves's disease (exophthalmic goiter) must, of course, be excluded; likewise other persons presenting symptoms of exaggerated activity of the thyroid gland. This is but natural, for what we seek to obtain through the treatment is an improvement of the functions of a degenerated or insufficient and inactive thyroid gland.

Again, I have made it a rule to examine the pulse and heart of the patients every three or four days, and also to keep the condition of the urine under observation. I cannot see any possibility that while keeping the patients under such strict supervision thyroid treatment could present the least danger. For even if, after large doses, the earliest symptoms of intolerance should begin to show themselves, all that would be required would be to suspend the treatment for a time.

It is to be understood that the preparations used should be carefully selected, and only such preparations employed as are already known through previous experience to have given good results. I have knowledge of quite a few cases in which it had been maintained that thyroid treatment gave no results whatever, but in which I was able to convince myself that ineffective thyroid

extractives had been used, for the same extracts administered to other patients likewise gave no results.

In general, even in the early years of thyroid treatment, twenty-eight to thirty years ago, it caused bad results only when poor preparations were used or excessive use had been made of good preparations. Of course any other very active drug may lead to disagreeable consequences if it is abused of.

In conclusion, I may state that I feel well justified in giving preference, for purposes of rejuvenation, to the internal treatment by glandular extracts, for in experienced hands any disagreeable consequences of it are *with certainty* obviated, something that cannot be said for the operative treatment. At the same time the internal treatment produces results that are but little inferior to those obtained by operation *in man.* Especially is this the case if one enhances the effects of the gland treatment by using at the same time certain drugs, such as arsenic, iron, or the iodides, and the ultra-violet rays of sunlight.

IV

REJUVENATION BY THE USE OF IODIDES AND CERTAIN OTHER DRUGS

THE rejuvenating effects of arsenic have already been known for a long time. I mentioned them in my book on "Old Age Deferred," attributing the effects of arsenic to a stimulation of the sex glands, especially in women, in whom the rejuvenating effects are greater than those obtained in men.

Iron, in its different preparations, acts similarly, although its effects do not approach those of arsenic. If it is combined with arsenic, however, the effects of the latter, especially in women, become far more pronounced. Iron also acts through its influence upon the sex glands, especially those of the female sex, stimulating them to increased activity.

In the book above referred to, I also pointed out the rejuvenating effects of the iodides. These stimulate the activity of the thyroid gland. In fact, as shown by Dr. Charles E. de M. Sajous, of Philadelphia, in his classic work on "Internal Secretions," the various active drugs availed of in the art of healing all at first excite or in some way

modify the activity of these various glands, the effects they produce being consequent upon this stimulating or modifying action.

In treating arteriosclerosis, the disease most constant in old age, we give iodides as the best remedy at hand. In doing so we administer the main element contained in the thyroid gland. But we can give it to old persons even for the sole reason that in old age the thyroid, as a rule, shows less iodine—a fact established by prominent authorities, such as Magnus-Levy.

A thyroid that contains little or no iodine is not an active thyroid. When we give iodides under these conditions, as shown by Kocher and others, we increase the iodine content of the thyroid gland. Therefore I have recommended the use of iodides in very small quantities even to healthy persons who are on the borderland of old age, as a preventive. I would like to add here that the quantities to be given depend upon the age of the subject and upon whether more or less pronounced symptoms of incipient old age are present.

More can be given in confirmed cases, in persons suffering from the effects of old age, especially men in the fifties or sixties. In advanced old age we may give less.

In persons between fifty-five and sixty-five years

of age I have witnessed a rejuvenation following doses of about eight, ten, twelve, or fifteen grains of iodine a day, ingested in the various preparations of the iodides. One should proceed only with great caution with such doses, however, not exceeding ten grains a day unless it is quite necessary.

The rejuvenating effects of such doses can be explained on the basis of the researches of Steinach. He has shown that agencies which produce a degenerative effect upon the externally secreting portions of the testicles, *i.e.,* the seminiferous portions, at the same time induce an increase in the normal activity of the internally secreting portion which may go so far that even an actual hypertrophic condition, with the growth of many new cells, follows.

Such a condition may be a result of ligation of the seminal ducts, but it may also be brought about by such other procedures or drugs as produce a degenerative effect upon the seminiferous structures. Now, the Roentgen rays are capable of producing such an effect, a fact already well known years ago. In conjunction with the Roentgen specialist, Holzknecht, Steinach carried out researches in this direction and found, indeed, a certain degree of rejuvenation following his experiments.

That x-ray exposure may destroy the fertility

of male and female animals is a fact that was demonstrated years ago and applies to human beings. Indeed there are cases in which, for the relief of certain diseases of the female sexual organs, x-ray or radium treatment is substituted for an operation, and results may follow which are quite similar to those of operative removal of the ovaries.

Thus, there are two ways of obtaining the effects of removal of the ovaries: (1) By operation, (2) by Roentgen ray treatment.

There are also certain drugs which exert a similar deleterious influence upon the seminiferous portions of the testicles, *viz.*, the iodides. Years ago there were published reports from different parts upon the destructive effects of large doses of iodides on the testicles, with harmful results as regards fertility. When iodides are given in certain quantities the symptoms of intolerance may present themselves, constituting a condition we term iodism.

These symptoms are due very probably to an exaggeration of thyroid activity. Iodine being contained in the thyroid gland in larger amount than in any other gland and constituting its most important component substance, it will readily be understood that if too much of it is given it will excite an unduly pronounced activity of the gland. Strange to say, I have myself observed—and with

me a number of others—that frequently even relatively small doses of the iodides produce such an effect, *viz.,* iodism, yet if afterwards larger doses are given, they are well borne and bring about a feeling of well being and all the beneficial effects known to be characteristic of this drug.

I am not among those who look with alarm upon these symptoms of thyroid excitation.

I do not consider it an untoward result if an arteriosclerotic person, with symptoms of sclerosis of the brain vessels, suffers from one of the typical symptoms of iodism, *viz.,* a running at the nose. Indeed, as I show in my book on the improvement of human intellect, such persons ought to be thankful if the circulation of the brain is relieved this way, close relations existing between the circulation of the blood-vessels of the brain and that in the vessels of the nose.

Nor can it be considered as a serious drawback if toxic substances are carried out and deposited at the periphery of the body, in the skin, giving rise to pimples.

A feeling of marked lassitude may also be present as one of these symptoms, and not infrequently also an attenuation of the sexual function.

Not by any means do I consider such a condition of iodism as an unfortunate event, for it is only a passing stage, and if larger doses are given, it

may disappear altogether. Indeed, in such cases as I have noted recently, in which large doses of iodides had been given on account of previous syphilitic infection, a marked state of well being can be produced for a certain period of time, with an increase of muscular strength.

Long walks and climbing in the mountains became possible without the subsequent feeling of great fatigue. Likewise the sexual desire reappeared, sometimes even in a higher degree than before the treatment. These persons, furthermore, began to look younger than their age, and in general became decidedly more vigorous.

I feel inclined to account for these rejuvenating effects on the basis of the experiments of Steinach. After having first exercised a deleterious effect upon the seminiferous structures, a stimulation of the internally secreting portion probably took place,

I would also venture the same explanation in regard to the well known rejuvenating effects of arsenic. Here again, only large doses are efficacious.

A very good illustration of this fact is presented by the Styrian arsenic eaters. In Styria, a province of Austria, it is the habit of many persons to eat large quantities of arsenic, which is taken in such doses as would prove fatal to others. They begin the course with small doses, and then slowly

habituate their systems to the use of larger ones until they reach poisonous amounts. Probably this habituation is induced by the fact, noticed by themselves, that upon taking arsenic habitually their bodily strength improves and they are enabled more easily to climb over the steep, high mountains that form the greater part of their country.

These persons appear much younger than one would expect from their real age. A few women about fifty-eight to sixty-two years of age, whom I saw, looked like young women.

Strange to note, rejuvenating effects similar to those in Steinach's old rats can be observed in such persons. They grow an abundance of hair on the head, as well as in the form of a beard, are very vigorous, and look many years younger than their actual age.

I think it probable that arsenic produces these effects through its deleterious influence—in large doses—upon the sexual glands, with subsequent stimulation of the internally secreting portions of these organs.

Probably there exist several drugs having this effect. From certain observations I feel strongly inclined to include mercury among them. I have certainly seen in several syphilitics, after a radical cure by mercury, such rejuvenating effects as an abundant growth of new hair—but have not had

the courage to recommend such a cure for purposes of rejuvenation.

In describing the various means for effecting rejuvenation I am simply fulfilling the task of a writer on the subject, *viz.,* that of discussing the different measures which lead to the desired result. But this certainly does not mean that I advocate every one of them. Indeed, I must emphatically warn against the use of large doses of iodides or arsenic for such purposes, except in cases in which syphilitic infection has previously been acquired.

On the other hand, I do not see any harm in the use of small doses of these drugs, if this be done under intelligent and immediate medical control, especially as an auxiliary agency in the treatment by gland extracts—as a species of stimulant to the thyroid and sexual glands.

Arsenic is capable of doing much good in cases of anemia, neurasthenia, and hysteria, and iodides can be of great value in arteriosclerotic conditions. The latter, while most frequently present in old age, was also found in the course of numerous autopsies during the late war in younger individuals previously free of any apparent symptoms of such a condition.

It is useless to wait to administer iodides until arteriosclerosis has become established in a high degree and irremediable organic changes have

taken place. A slow, sluggish circulation is nearly always present in aged persons, and sometimes even in younger subjects, and I should like to insist upon the important fact that the iodides, by diminishing the viscosity of the blood, assist in the rapid passage of the blood through the smaller arteries and capillaries.

V

REJUVENATION BY MEANS OF THE ULTRA-VIOLET RAYS OF NATURAL AND ARTIFICIAL SUNLIGHT (QUARTZ LIGHT)

SEVERAL thousand years ago, in the sacred books of the Hindus, a rejuvenating effect was attributed to the sun's rays. The latter were stated therein to restore vigor to the muscles of the aged, and to enliven their minds. Indeed, such a belief in the healing and conserving properties of sunlight can be traced in many of the nations of remotest times, not only in Europe, Asia, and Africa, but likewise in America, where both in Mexico and Peru the sun was worshipped as one of the principal deities, as described in the wonderful works of the great American historian, Prescott.

As the renowned English astronomer, Sir William Herschell, puts it, the sun is the source of all energies on earth. There can be no doubt of this fact. In the last analysis, it is the rays of the sun that drive the wheels of all machines and all ships, for the coal, oil, or gasoline they burn is nothing else but stored up energy of sun's rays which shone many thousands or even millions of years ago upon prehistoric plants and trees. The

oil substituted for coal is also a product of the energy of these rays stored up in the grains and seeds of the plants.

The sun is the greatest motor on earth, and even the source of electricity can likewise be ascribed to the effects of sun, which takes up the water from the surface of the sea and lets it fall again elsewhere as rain, thus not only procuring food for animals and man, but creating the rivers and augmenting their flow, which yields energy to be transformed into electricity.

Everywhere we come back to the sun's rays as the driving agency to all living creatures, and the source of all forces on earth.

The sun's rays actually constitute the driving force behind the human mechanism. Every beat of our heart can be traced back to the sun as the causal agent. The heart is a muscle, and as with other muscles, its work is done at the expense of a carbohydrate, known as glycogen, which is stored up in it. After work has been done by the muscles, less of this carbohydrate is to be found in them, depending upon the amount of work done. To create this carbohydrate, however, sunshine is indispensable. For only with the help of the sun's rays is starch created and deposited in the plants, which, when ingested by us, are transformed in our systems into sugar and deposited in the muscles

in the form of the above mentioned substance, glycogen.

If, now, we remove the heart from an animal while it is still living, after the heart has stopped beating already for hours it can be made to beat again, even for days, if a solution of sugar is placed in its cavities.

I recommend the giving of plenty of sweets, especially honey or cane sugar, to persons suffering with weak hearts.

The sun's rays do not merely act favorably on bodily health, but also on the condition of the mind, improving it markedly. I have observed the deleterious effect—amongst others—of lack of sunshine on the mentality, and here I would like to add an observation made on 157 Hungarian prisoners who, after the Hungarian Revolution of 1848, were kept for some years in the deep dungeons of the Spielberg at Brünn (Moravia), wherein no sunlight penetrated. As a result, about 10 per cent. of them became hopelessly insane, and the remainder sank into a melancholic condition or deep mental depression from which they continued to suffer for some time after being set free.

In "Old Age Deferred" I have already praised the effects of sunshine as a means of treatment for old age, and I would now add a series of new facts, especially of my own observation, upon the

rejuvenating effects of the ultra-violet rays of sunlight.

As was already proved by Sir Isaac Newton, the spectrum of the sun, which shows an apparently white light, is composed of several rays of different colors. If one causes the sun's rays to pass through a glass prism, or if one holds a diamond ring against a piece of white paper and lets the sunshine pass through it, there is seen a kind of rainbow with its various colors. One sees the following colors: Red, yellow, green, blue and violet. But after the violet there come still other rays, which, however, have such short wave lengths that we cannot see them. These are the ultra-violet rays, which are invisible. There exist also rays with wave lengths much shorter still, of very great intensity and healing power, but sometimes of fatal, destructive action—the Roentgen rays or x-rays.

These radiations differ in their wave lengths, rate of vibration, and likewise in their actions.

The most active rays contained in sunlight are the blue, the violet and especially the ultra-violet rays. This fact has been proved experimentally by the researches of a number of prominent scientists, of whom I may mention as one of the earliest and greatest the Dane, Finsen. Indeed, we can easily study the effects of these rays, for we are

able to produce by certain means a light consisting mainly of ultra-violet rays. For example, if we pass an electric current through mercurial vapors, thus rendering them incandescent, we obtain a blue-green light of the greatest intensity, which is enormously rich in ultra-violet rays. In fact, it contains scarcely any others except the blue and violet rays, and very little if any of the red or heat rays.

The ultra-violet rays do not develop any marked activity if they are passed through glass, for glass arrests about 90 per cent. of these rays. But quartz allows them to pass through easily without absorbing any of their strength. We can thus readily study their effects by exposing persons for a certain time to their action.

The first thing observed is that after this light has been directed from a short distance for at least ten to fifteen minutes or more on the uncovered body surface, there appears a reddening of the skin. After more prolonged exposure, an inflamed condition of the skin may result, which may persist for a few days.

No doubt this reddening of the skin is the proof of a more rapid passage of the blood through the smaller arteries and capillaries, which have become dilated and thus allowed the blood to pass through more quickly. These vasodilator effects of the

ultra-violet rays were already demonstrated by Finsen.

It will readily be understood that in exposing a large surface of the skin to such light one has an excellent means of favorably influencing the general circulation.

When more blood gets to the periphery of the body, more of it is taken away from the internal organs, and this might prove most beneficial in congestive conditions, and especially in reducing high blood pressure.

Thus, it will not seem surprising that a reduction of high blood pressure has been reported by various observers, *e.g.,* Bach, in his book on the actions of the quartz lamp (artificial sunlight). I have also myself recently observed a few such cases.

Even the natural sunlight, if rich in such rays, is capable of producing similar effects, as was first ascertained by the late Dr. Malgat, of Nice,[4] and as is also stated in the report of D'Oelsnitz on "L'héliothérapie, complément du traitement climatique," at the Congress in Monaco (April, 1920).

It is a fact of great importance that, as the researches of the Danish physician, Hasselbach,[5] demonstrate, exposure to these rays powerfully promotes the respiratory processes. Indeed, it has

[4] Malgat: La cure solaire de la Tuberculose, Paris, 1911.
[5] Hasselbach: Hospitalstidende, 45, 47, 1905.

been found by several observers that the organic combustion and processes of oxidation in the tissues are very much increased through the action of the ultra-violet rays, the blue rays also being active in this direction. Quincke, years ago, emphasized these facts,[6] and likewise Bering,[7] who reported an increase of the red blood corpuscles and of the hemoglobin content of the blood under the influence of the violet and ultra-violet rays.

The ultra-violet rays also have a marked influence upon muscular agility, as I found by experiments on myself consisting of exposure at over 100 sittings to the ultra-violet rays from a large quartz lamp. I have often noticed in my patients a disappearance of lassitude and fatigue and a very notable increase of muscular strength. They were able to climb the mountains about Carlsbad more easily after having taken several times such a bath of ultra-violet rays at the bathing establishment at the Spa. I noticed this even in anemic young girls and women, whose general condition was very markedly improved by this treatment.

In view of the fact that, as a general rule, there is a slow, sluggish blood circulation in old age, very frequently a high blood pressure, and in addition a diminution of the processes of oxidation

[6] Quincke: Archiv für die gesammte Physiologie, Bd. 57.
[7] Bering: Med. Natürwissenschaftliches Archiv, Bd. 1. 1907.

and marked muscular weakness—all these being typical of old age—it was but natural that the thought should come to me to apply these remarkable rays, which improve the circulation, condition of the blood, organic combustion, and the agility of the muscles, to the treatment of old age. Indeed, the results obtained were excellent, and from observations made on several patients last summer, and likewise on myself, I can recommend exposure to the ultra-violet rays, whether those of the quartz lamp or of very pure sunshine, as an excellent measure for purposes of rejuvenation.

My first patient—other than myself—was a merchant of fifty-two years, who had been operated two years before by Prof. Finsterer, of Vienna, for ulcer of the duodenum, and was directed to my treatment in Carlsbad by Prof. Salomon, also of Vienna. At his first visit I found an anemic, very weak man, not equal to any lengthy walks, and looking fully as old as his age suggested. I recommended, in addition to a very mild water cure, daily light baths with the quartz light. After three weeks of daily exposure to the ultra-violet rays this patient could hardly be recognized as the same man. He now appeared to be between thirty-five and forty years of age, and presented an aspect of blooming health, with rosy cheeks. He had gained more than ten pounds in weight.

An increase in the bulk of the muscles and of the weight in thin persons has often been reported in consequence of the use of these rays. On the other hand, in the case of fat persons, frequently a very notable reduction of weight takes place, which agrees with the fact that, as mentioned above, the processes of oxidation are greatly increased by these rays and the fat in the system therefore better burnt.

The best rejuvenating results obtained by me were secured through combination of the treatment by gland extracts with the light bath with the ultra-violet rays.

All the effects above described as resulting from the gland treatment appeared more rapidly and in greater measure. The persons thus treated presented a flourishing appearance, and looked considerably younger than their age. They showed marked muscular endurance and were able to make long excursions on foot without feeling very tired. One of them, a weak neurasthenic of fifty-five years, was able to dance night after night most indefatigably, and also gave evidences of virility becoming a man of much younger years.

I wish to call particular attention to the great influence of these rays as regards improvement of muscular agility and increased endurance.

In cases of diminished sexual desire and potency,

and in general in neurasthenic conditions, the treatment proved excellent.

It is interesting to note that, just as in the rats and human subjects operated on by Steinach's method, the condition of the hair notably improved in addition to the other symptoms of old age. Indeed, such treatment has been employed for several years with the best results in cases of falling out of the hair, an abundant growth of hair sometimes resulting even on bald heads. Here again the results were far more notable in women than in men, but in the latter also they were sometimes of a very satisfactory nature, especially in seborrheic conditions.

In obtaining rejuvenation with the ultra-violet rays it is not indispensable to apply solely the ultra-violet rays of artificial origin, such as those of the quartz light.

Similar results can be secured more or less perfectly with natural sunlight. It is then necessary, however, to employ only a very pure, clear sunshine. In many regions, especially in cities, this is very difficult to obtain. One cannot expect to get ultra-violet rays from sunlight that has had to pass through layers absorbing these rays, which are easily intercepted by dust, smoke, vapors, etc.

The purest sunshine, and the richest in ultra-violet rays, is to be had at the seaside, where the

air is purest, as also on the tops of very high mountains.

In lying down on the beach at a seaside resort in California the great content of ultra-violet rays in the sunshine is further enhanced by reflection from the glittering sand and the mirror-like surface of the sea. Similar conditions in Europe are to be found on the Riviera in France and Italy, where, for instance, as in Nice, Monte Carlo, Menton, and San Remo, there is on one side the gleaming mirror of the Mediterranean, and from its surface the rays are reflected upon the high, bald mountains in the background. The deep blue sky greatly augments the effects. It is a proof of the great content of blue rays in the air (the blue color of the sky is an effect of polarisation).

Increased temperature of the air enhances its content of ultra-violet rays, according to the observations of Vallot.

Sunlight is also very rich in ultra-violet rays in the high mountains, as in Colorado and Arizona, especially at places situated at a high altitude or where there are high, bald, white, glistening mountains in the background. In Europe such conditions are found in the high mountains of Switzerland, *e.g.,* at Leysin, where Dr. Rollier is obtaining such splendid results in children with tuberculosis of the osseous system, and at St. Moritz

and Davos. In such places there is the effect of reflection of the sun's rays from the gleaming snow to the high mountains in the background. Similar conditions prevail in the High Tatra in Czecho-Slovakia.

For those whose means do not permit of their going so far away from home, the best expedient will be to lie down at the seaside or on a river bank without clothing and let the sun shine on him. If there is no sea or river nearby, a terrace in a garden with plenty of sunshine, or a room with southern exposure on the top floor of a house, will do.

To obtain the full effect of the ultra-violet rays the body must be kept motionless. The least movement may diminish the results. The same holds good in treatment with the quartz light.

It is very important not to expose the body for a long time at first, but only gradually—ten minutes the first day, and then gradually increasing up to thirty, fifty, and sixty minutes—exposing different sides of the body alternately. It has been found by Bach, however, that good results can be obtained likewise if only a part of the body is uncovered and exposed, *e.g.,* the chest and back. To this I can subscribe from my own observations.

In strong sunshine the head should be covered.

After the sunbath, whether in artificial or natural

ultra-violet rays, the quantity of urine passed is augmented, and enhanced elimination of uric acid takes place. This can be judged roughly from the fact that a urine previously of a light color now looks dark red, thus affording evidence that the processes of oxidation have actually increased through the effects of the light bath.

We can convince ourselves of the remarkable effects such light baths are capable of producing in the external appearance by considering the photographs of young girls treated for a time in this manner in the clinics of Rollier, as published in the last volume of Eulenburg's Encyclopedia. Looking at these illustrations one observes how from homely, thin, and wretched looking creatures, literally skeletons, these girls were transformed into beauties with well-rounded limbs and prominent mammary glands, the pictures of splendid health.

One of the assistants of Rollier, Bardenheuer, observed the additional good effects of such treatment upon the condition of the blood, the result being an increase of the red blood corpuscles and hemoglobin similar to that noted after treatment with the artificially produced ultra-violet rays.

Indeed, all of the effects of the ultra-violet rays of the quartz lamp can be produced by natural sunlight, provided it is very rich in ultra-violet

rays. In fact, personally I give preference, as always and everywhere, to the natural means, the natural sunlight, if only it can be secured in all its purity.

As previously mentioned, the ultra-violet rays possess the shortest wave lengths of any rays in the spectrum of the sun. At the same time the number of their vibrations mounts up into the billions. If these reach our skin, no doubt marked effects must be produced, and the immense energies contained in them be transmitted to the tissues.

They also reach the terminals of the numerous nerves at the periphery of our body, causing there a certain stimulating impression, and according to the great French investigator, Bouchard, the energies thus taken up by the nerve ends are transferred to the central nervous system and from there to all the internal organs, imparting energy to them.

If, when tired, we rest for a time under the quartz light or exposed to the rays of a pure sunshine rich in ultra-violet rays, we feel markedly invigorated (except if the sun is too hot, containing too much of the red rays, which impart heat), and at the same time very often we may find ourselves much heightened in spirit. The energies of these rays transmitted to the central nervous system make their effects felt in the mind itself.

Thus, against a mental depression, a melancholic condition, a morose disposition, a stay for a certain period in such sunny regions as California, Arizona, Colorado, Mexico, the Bahama Islands, Florida, Cuba, and in Europe on the French and Italian Riviera, Andalusia (Malaga), the Portuguese Riviera, Greece, etc., is frequently capable of yielding the best results, as also travelling in Egypt.

In my book, "Building Human Intelligence," and in my latest book on the "Improvement of Poor Memory by Hygienic and Therapeutic Means," I have clearly shown the favorable effects of such a climate, and I would now like to add that, as the report of Armand Delille on "Héliothérapie préventive," at the last Congress on Light Treatment in Monaco pointed out, similar results have been observed among the children kept in the asylums and sanatoriums on the Riviera. He lays stress upon the improvement of the *dispositions and mental condition* of these children, and says, for example, "l'harmonie et la gaieté règnent d'une manière constante parmi les élèves de l'école au soleil," thus proving what I stated in my book on "Building Human Intelligence," in which I advocated the institution of open-air schools.

An English physician, Dr. Truby King, visiting the establishment of Dr. Delille at Sylvabelle, con-

firmed these observations, finding the children, as Delille says, "exubérants de vie et de gaieté." Dr. Rollier, of Leysin, had already published similar observations concerning the great improvement in the mental capacities of the children, and Revillet noticed the same thing among the Swiss children who were kept at the Asylum for Children of the Swiss Republic at Cannes, on the French Riviera.

Thus we see that the ultra-violet rays—in which the sunlight in these regions is exceedingly rich—act also upon the mental condition, producing results similar to those following the operations of Steinach on rats and human subjects.

I was able to observe improvement of the mental condition likewise in aged persons after treatment by the ultra-violet rays from the quartz lamp. They showed more interest in reading scientific books, and found it easier to retain in their memory things they had just read. Past events were also better recollected. Mental arithmetic became easier for them.

Similar observations on aged persons may be made also after a sojourn in regions enjoying pure sunshine rich in ultra-violet rays. If we send overworked and neurasthenic business men into such regions for a vacation, we can often see marked improvement not only in their bodily but also in their mental condition. After a prolonged stay in

such districts we not infrequently see them presenting a more youthful aspect when they return.

We can also often note that in such sunny climates aged persons who are doing work in the open air, out in the sun, appear considerably younger than their actual age.

I would like now to take up the question as to how the rejuvenation is brought about through the ultra-violet rays. Here, as always, when rejuvenation occurs, it is effected, as my observations and the operative results of Steinach demonstrate, in one, and only one, way, *viz.*, through stimulation of the endocrin glands, especially the thyroid and sexual glands, by the ultra-violet rays.

I can prove by direct evidence that this is more than a mere supposition. The ultra-violet rays, like the Roentgen rays, to which they are closely related, exercise a direct influence upon these glands; only, the intensity of their action is different, that of the x-rays being much more powerful—actually deleterious—than that of the ultra-violet rays, which are more of a stimulating nature, upon both the externally and the internally secreting portions of the testicles and ovaries. The x-rays, however, as previously mentioned, destroy the externally secreting portion, and in consequence are powerfully stimulating to the internal secretion.

Ultra-violet Rays

Last summer I treated several young girls and women for goiter by exposure to the sun, at the same time administering thyroid and iodine treatment. I found that upon combining the drug treatment with the treatment by the sun's rays the results were far better. These persons took the sunbath on the shores of a river flowing on the outskirts of Carlsbad, or lying in a canoe on the river. This is an especially efficacious procedure, and upon lying in a rowboat on the river, in the sunshine, for a certain time an intense pigmentation of the skin can be obtained as proof of the direct action of the ultra-violet rays. It would not be wise, however, to take such a sunbath on very hot summer days and certainly not at noon.

The method requires a clear, pure sunshine, rich in ultra-violet rays, but not the excessively warm rays of the sun on hot summer days with a close atmosphere. On such days the morning hours up to about 10:30 or 11, or the afternoon after 4 o'clock, are most suitable, in order to avoid sunstroke.

There can be no doubt that this measure, especially in regions where the sun is rich in ultra-violet rays, is capable of powerfully assisting in the treatment of the diseases of the thyroid by thyroid gland.

Sometimes there are good results even without

the thyroid. Thus Revillet, of Cannes, obtained very good effects in children with congenital myxedema who were sent from Switzerland to the Asylum for Children of the Swiss Republic. Through simple exposure to the sun's rays of the Riviera, rich in ultra-violet rays, these children were cured without the use of thyroid preparations.

In recording these results Revillet[8] also draws attention to a very interesting fact, mentioned in a report by Prof. Dupasquier, of the University of Lyons. He found at a small place called Allévard, in the Alpes Dauphinoises, that on the shady side of a street there were cases of cretinous goiter to be found in nearly every house—the sun never shone on this side of the street—whereas no such case could be found on the other side of the same street, which was the sunny side. It is a fact that idiocy and cretinous goiters are to be found with the greatest frequency in the deep, sunless valleys of Switzerland and Italy.

That the salutary results above referred to are brought about by the ultra-violet rays of the sunshine is best proved by the fact that the artificial sunlight, the quartz light (from the large quartz lamp), which consists mainly of ultra-violet rays, exercises a very wholesome influence upon the thy-

[8] Revillet: Le myxoedème endémique, La Province Médicale, 1911.

roid gland. Thus, Haselberg[9] reported in a Swiss medical periodical that such treatment yielded excellent results in a number of girls and women suffering from goiter.

The ultra-violet sun's rays exert a similar favorable influence upon the other endocrin glands, including the sex glands. This is shown by the fact that in southern countries, with sunshine rich in ultra-violet rays, menstruation appears in young girls much earlier than in the north. The interesting fact has been recorded by Arctic travellers that with the appearance of the polar night, or several weeks thereafter, the Eskimo women sometimes cease menstruating, the function reappearing only after the sun has returned.

A similar direct influence of sunlight rich in ultra-violet rays has been reported by Revillet. In eighteen young, anemic girls in whom menstruation had been absent for several months he observed reappearance of the same after exposure for a certain time to the ultra-violet rays of the Mediterranean sun.

Solar treatment is also capable of giving the best results in the treatment of affections of the uterus and ovaries. But this applies even more to the treatment with the ultra-violet rays of the quartz light. Indeed, in modern gynecology such

[9] Haselberg: Correspondenzblatt für Schweizer Aerzte, 1911.

treatment is availed of with great profit. As the results of Bach and others have shown, such treatment is also very efficacious where menstruation has been absent for a long time on account of certain diseased conditions.

On the basis of the above facts I have come to the conclusion that the ultra-violet rays serve as *activators* of the functions of the thyroid and sex glands.

According to my observations, there exist also a series of symptoms which prove that the effects obtained with the ultra-violet rays are to be attributed to stimulation of the endocrin glands, especially the sex and thyroid glands. Not only may, as already mentioned, exposure to the ultra-violet rays induce some of the symptoms which Steinach obtained through stimulation of the sex glands by operation, but we find appearing after sunlight treatment, whether with the artificial or natural sunlight, such symptoms as are known to be characteristic of stimulation of thyroid activity, *viz.*, increase of the pulse rate, temperature, activity of the sweat glands, and output of urine; better elimination of the urinary solids, such as urea, uric acid, sodium chloride, etc., and also an increase in the number of red blood corpuscles and in the hemoglobin.

As in the case of thyroid gland, these rays also

act very favorably upon the osseous system. They assist in the retention of lime in the system if it is present in sufficient quantities in the food. The best proof of their influence upon the osseous system is afforded by the fact that upon exposure to these rays for a certain period of time, ulcerations and all other lesions of the bones are so successfully influenced that there is no other treatment comparable to it.

Likewise healing of wounds of the soft tissues, including the formation of granulations, can be promoted by these wonderful rays as though by thyroid treatment.

Their action upon the nervous system and mentality can also be classed as nearly up to that exerted by thyroid gland, and when both are used together, they are capable of producing these results in a still higher degree.

Not only the ultra-violet rays, but also the other forms of radiation, such as the Roentgen rays and the rays emitted by radio-active substances, are capable of exercising direct effects upon the sex glands and the thyroid.

The action of the Roentgen rays upon the sex glands has already been mentioned. Radium also exerts a direct effect, for it has been found that the sex glands of animals exposed to such radiation show destructive effects and that subsequently

sterility results. Even tumors of these glands can be destroyed by these rays.

Such deleterious effects of the Roentgen rays and of the rays emitted by radio-active substances may also be applied to the thyroid gland. This fact is availed of with success in the treatment of exaggerated activity of this gland.

Indeed, these rays seem to have a kind of affinity for the parenchymatous cells of the thyroid and other glands, for while leaving the skin unharmed, they act directly upon the secreting cells of these glands, causing their destruction. In Graves's disease, therefore—generally in its first stages, when the secreting cells are still hypertrophied—prophylactic treatment along these lines may give the best results.

These effects are obtained with the greatest degree of certainty in young girls and women in whom the disease is not yet advanced. Of course, the treatment must be carried out with great prudence, the object being to cause the overdeveloped tissues that are the cause of the exaggerated activity of the gland to disappear, but to avoid undue injury by destroying the whole gland, thus exposing the patient to the opposite condition, myxedema. Therefore, just as with the prophylactic thyroid treatment, merely the symptoms of hyperthyroidia should be controlled in these cases, and

the treatment continued only as long as such symptoms are present.

At all events, in cases in which the disease has not yet led to the formation of much connective tissue, such treatment is capable of giving the best results and is always to be preferred to operation.

An American, Francis Williams, of Boston, was the first to treat this disease with the Roentgen rays.

The x-ray treatment also often gives excellent results in enlargements of another small gland, not larger than a hazelnut, which lies at the base of the skull, the pituitary gland. The resulting disease, acromegaly, is characterized by enlargement of the hands, feet and nose and by severe headache and progressive loss of sight.

VI

PRODUCTION OF A YOUTHFUL APPEARANCE BY MEANS OF THE ULTRA-VIOLET RAYS

IF we consider the faces of the young girls and women of ancient Egypt, painted on the sarcophagi which contain their bodies, the nicely bronzed color of the faces of these daughters of sunny Egypt is likely to make a favorable appeal to us. Indeed, at the present time there is a craze among the young ladies of several countries of northern Europe to expose their faces for hours to the direct action of the sun's rays in order to obtain such a color, and in Paris I have seen in the windows of the perfumery shops powders of a similar bronze color, intended for the artificial imitation of this facial appearance.

A bronze color of the face very often imparts a more youthful aspect, and indeed, it is at the same time an expression of excellent health, advertising this condition and from this fact alone producing a favorable impression on the observer.

But there exist also facts which prove that it is more than a popular belief that a sunburnt, bronze-like color is an evidence of good health, for it has been observed by quite a number of medical authorities that patients, *e.g.*, tuberculous subjects,

who are sent to countries rich in ultra-violet rays—these being the most effective owing to their bactericidal action—show the best therapeutic results if they acquire a pigmentation of their faces from the effects of the sun's rays. Now such a pigmentation can be best and most rapidly acquired in the presence of sunlight rich in ultra-violet rays. That this is true is best proved by the fact that the quartz light, which is extraordinarily rich in such rays, can produce such pigmentation in the shortest time. It first produces a hyperemic condition of the skin, and afterwards there remains a pigmentation. I know quite a number of ladies who have used the quartz light merely to produce such a condition.

The pigmentation is best obtained when the skin has been gradually exposed to the sunlight. If the face is abruptly exposed for too long a time to sunlight rich in ultra-violet rays or to the quartz light, then after the hyperemic condition, its higher degree, an erythema, and even an actual inflamed condition of the skin may result. A few days later, however, the skin will scale off (desquamate) and a healthy new skin with fine complexion will appear. The same thing will happen as in cases of erysipelas that have healed. Young girls previously distressed on account of their swollen and inflamed faces then see appear-

ing by way of compensation a much finer skin and fresher complexion than they had ever had before; indeed, they often look much younger.

Such treatment also gives excellent results in the case of various blemishes of the skin of the face such as pimples, redness of the face and especially the nose, exaggerated sebaceous secretion, etc.

Since at the same time, as the hyperemia shows, the skin is being better nourished with blood, sunken features are benefited by this treatment, and the cheeks, better supplied with blood, look fuller and rounder, such a condition frequently resulting as if arsenic had been taken for beautifying purposes.

Rejuvenation by the ultra-violet rays can thus be produced both by the internal and the external, *i.e.*, cosmetic, action of these rays.

But their internal action also has marked cosmetic results. Acting like treatment through the thyroid and sex glands, or better, through stimulation of these glands, which govern the processes of general nutrition and organic combustion, the appetite is much increased, and through the consentaneous improvement of digestion and assimilation, the muscles become better developed and a full, round face and round limbs will result, constituting a picture of youth and health similar to

that presented by the young girls and boys who had been admitted several months before as cachectic skeletons, with prematurely old faces, for sunlight treatment at the sanatoriums of the high mountain stations in Switzerland or on the Riviera.

As in the case of treatment with thyroid and and sex glands, the fat is better burned under the influence of the ultra-violet rays. Thus, we observe both after treatment by natural sunlight in regions with an abundance of ultra-violet rays, and after treatment by the quartz light, a considerable loss of weight, stout women and men becoming transformed into persons with a more youthful appearance. On the other hand, under such treatment thin, skinny bodies develop rounder forms.

After natural or artificial sun treatment (by the ultra-violet rays, which do not contain the enervating heat rays), the muscular agility likewise being greater, the patient enjoys a better appetite, and in consequence of the better feeding development of the muscles and an increase of weight take place.

I would like to recall here the fact that Steinach observed like results after the operation on his old rats, which, while quite lacking in appetite before the operation, developed a voracious appetite after it, with such effect that at their autopsy he found

a striking development of the muscles and a marked increase of the fatty layers.

The favorable influence of these rays upon the osseous system may, in common with thyroid treatment, lead to a better growth of the bony skeleton. But it also exerts a favorable influence upon the condition of the teeth. A youthful appearance depends to a marked extent upon a good condition of these structures. The greatest cause of loss of the teeth is pyorrhea. Now I have found that by exposing the gums daily for a certain period to the quartz light or to the direct rays of a pure, intense sunshine, this condition can be very much improved or at least checked. A very efficacious treatment against this condition is also the application of fluids containing the emanations of radioactive substances.

Thus, not alone the ultra-violet rays, but also other kinds of rays are capable of yielding cosmetic results.

The condition of the hair can be improved not only with the ultra-violet rays but also with the Roentgen rays. These must, however, be used with extreme caution, only the very soft rays, which are less penetrating, being employed. In cases where the ultra-violet rays exert no effect, such rays may yield results. But great caution is then necessary, for not only might the hair that has

fallen out never grow again, but even the hair that still remains might be destroyed, never to return.

The radiations from radio-active substances may also yield very good results for falling out of the hair and for the growth of new hair.

Under their influences, it has been found, the thickness of each individual hair becomes greater, and the hair gets stronger and longer, and generally grows better.

The rays cause a kind of inflammatory hyperemia of the root of the hair, thus producing better growth—a fact demonstrated by Werner.[10]

Thus we see that each of these three kinds of rays may give good results in the production of rejuvenation. Indeed, these rays, in respect to their more intimate constitution, are closely related as to wave length, though their powers of penetration present certain differences. After the luminous rays of the solar spectrum follow the ultra-violet rays, which—especially the extreme ultra-violet rays—have the shortest wave lengths, *i.e.*, 0.02 μ. The spectrum of the x-rays could be united to these extreme ultra-violet rays if by some means the wave length of the very soft x-rays (rays of lesser penetrating power, the wave length

[10] Werner: Zur biologischen Wirkung der Radiumstrahlen, Münch. Med. Wochenschrift, No. 37, 1919.

of which is 0.0175 μ) could be prolonged and a missing link thus discovered.

The ultra-violet rays have no great penetrating power, as is generally maintained. They are supposed not to get much farther than into the skin, but according to Rollier they are transformed after their penetration into the body into long rays, which are able to penetrate further. At any rate, these rays certainly exert a marked action in the interior of the body, as is shown by the pronounced effects they produce.

The radiations from radio-active substances possess the greatest power of penetration. Thus, the x-rays have such enormous penetrating power that they can pass through lead plates nine inches thick.

We have already mentioned the extraordinary number of vibrations of the ultra-violet rays. But these are far surpassed in frequency and rapidity by the x-rays and the radiations from radio-active substances. The particles of which these consist—the electrons—travelling at an incredible speed, carry out a veritable bombardment upon our body, and we are thus led to understand the marked effects they may produce.

The ultra-violet rays may produce only a reddening of the skin, but if they act from only a short distance for a certain period of time, a mild inflammation results.

In order to study the effects of these rays, I have subjected myself to a number of sittings, and upon exposing my head very close to the glowing column of mercury vapor in the quartz light for about ten to twelve minutes I experienced a burn of the scalp, followed by crust formation. After a few days, however, these crusts fell off and not the least scar remained.

As a rule burns from the ultra-violet rays cause no scarring, but the same certainly cannot be said of the after effects of the x-rays or radium and its derivatives, for these are capable of producing serious burns and inflammatory conditions—even ulcerations—of the skin, with subsequent formation of disfiguring scars, unless the greatest precautions are taken and treatment given only by specialists.

It seems, at least in the case of radium, that the skin of women, and especially of fair haired ones, is far more sensitive to these rays than that of others. At any rate, for cosmetic purposes, for producing a youthful appearance of the face and in general for the purposes of rejuvenation, I prefer the ultra-violet rays to the other rays.

Radium may likewise give good results, however, if it is employed not in substance, as pure radium or its salts, but in the form of a gaseous product or emanation, such as is contained in certain markedly radio-active mineral waters.

VII

REJUVENATION BY THE USE OF RADIUM BATHS AND MUD BATHS

RADIUM can rightly be considered as a symbol of eternal youth. For it is constantly giving off energy, yet remains apparently unchanged all the time.

In the earliest periods after the discovery of the radium, this strange fact created a great sensation among the scientists, for it seemed to contradict the natural law of the conservation of energy, well established by Robert Mayer, whose sad fate was mentioned in the first part of this book. This mystery was solved, however, when it was detected that there is in reality even in this case no exception to the general law, for even if slowly and almost imperceptibly, radium in the long run dissipates some of the energy which had been stored up in the interior of its constituent atoms.

Whereas this property of radium in itself suggests to us its use as a weapon with which to combat old age, there is another of its properties which makes it especially suitable as a means for rejuvenation.

As previously mentioned, it exerts a direct action upon the sex glands—a fact established by experiments upon animals, radium producing, if applied in a certain strength, destruction of the seminiferous cells and sterility in consequence. Judging from the effects of the x-rays, stimulation and hypertrophy of the internally secreting portion will most probably occur likewise after radium.

Being averse to the employment of violent measures as long as there are milder and very efficacious ones at our disposal, I rather advocate the use of the radium emanations for our purpose. Their marked influence upon the ductless glands had already been shown years ago through the experiments of Bouchard and Balthazard.[11] These investigators injected fluids containing radium emanations into animals, and at the autopsy these emanations were found to have accumulated in the ductless glands, especially the adrenals and the spleen. They lay special stress upon the preference shown by the emanations for these glands, *i.e.*, the internally secreting glands.

The emanations are the result of spontaneous decomposition of radium substances, forming a gaseous product which occurs in most mineral waters. It is thus a product of the transforma-

[11] Bouchard and Balthazard: Comptes-Rendus de la Société de Biologie, Vol. 143.

tion of radium, and of course possesses radio-active properties, giving off certain radiations continually, *viz.*, the gamma rays.

This gaseous product, resulting from the transformation of radium, is contained in considerable quantities in some mineral waters, and in small quantities in almost all of them. There can be no doubt but that a good many of the actions ascribed to mineral waters are actually to be attributed to the emanation they contain, especially in the case of such mineral springs as are very slightly mineralized. Sometimes there are found springs which contain scarcely any mineral matter, *e.g.*, only a little iron and lithium, and yet they prove very active. In such cases the effects produced may be ascribed to their high radio-activity, on account of the rather large quantities of emanations they contain.

Such springs are, *e.g.*, those of Joachimsthal (St. Jachymow, in the Czech language) in Bohemia, Czecho-Slovakia, and those of Gastein, Austria, and a spring called Urgeirica, in Nellas, Portugal.

Of all the springs of the world, those of Joachimsthal and of Nellas are probably the richest in emanations, for these springs originate in mines of uranium metal, which yield radium in considerable quantities. It is in the uranium pitch-

blende of Joachimsthal that Mme. Curie discovered radium, thus perpetuating her name forevermore.

It was observed a long time ago that persons taking the baths at Gastein often looked younger, more vigorous, and fresher after their cure than before. Indeed, this place was considered a special spa for gouty and rheumatic persons of advanced age. When the radio-active properties of these springs were demonstrated, a clue was given to the special action of the water. In a higher degree, like things have been stated regarding the action of the springs of Joachimsthal—after they had begun to be used for therapeutic purposes, this spa having been erected scarcely more than twenty years ago.

Steinach, in his monograph, draws special attention to the rejuvenating effects of Joachimsthal and Gastein, ascribing them to the special action of these springs upon the sex glands. I can entirely subscribe to this opinion on the basis of personal observations, Joachimsthal being in the close vicinity of Carlsbad.

Among the cases treated with these springs, which I often prescribe in cases of gout and rheumatism as an aftercure to Carlsbad, I would like to mention the case of a Belgian gentleman seventy-six years of age, who was suffering from arteriosclerosis, gout, and marked muscular weakness.

After a few weeks' cure in Carlsbad I sent him to Joachimsthal to consolidate the results already obtained. When I visited him there two weeks later he accompanied me to my train and as I was in danger of missing it, this old gentleman to my great amazement ran swiftly up the high, steep hill before coming to the station, and strange to say, he was apparently not much the worse for it.

I was also able to make similar observations on myself.

In order to study the effects of these baths, and having much leisure in the summer following the war, I frequently went over to the neighboring Joachimsthal, walking a little over two miles from my house to the station. I noticed that after taking these baths my muscular agility was much improved, and I could walk much more easily and swiftly and with a much lighter step to my home than on the way to the station. I was using thyroid extract at the same time, as was also the above mentioned patient.

The rejuvenating effects of the radium bath can no doubt with full justification be ascribed to their special effects upon the endocrin glands, particularly the sex glands and in my opinion also the thyroid gland. Increase of sexual desire and potency after the use of these baths has been noted

by several authorities. Sommer[12] reported an increase of sexual desire in a monograph on radium and radio-activity. Waldes[13] made the same observation in diabetics after the use of baths containing a large amount of emanations. Gottlieb[14] records an improvement of potency in neurasthenic patients after the baths of Joachimsthal.

The effects on the thyroid gland are evidenced by the fact that after the use of radium emanations, as has been demonstrated experimentally, there follows an increase of the processes of oxidation, a rise of temperature, and a number of other evidences of increased activity of the thyroid gland. Increased elimination of uric acid is one of these, and the same effect can be produced by giving thyroid extracts.

There is no doubt that uric acid plays an important rôle in the production of old age, premature old age often resulting in this way, according to my recent observations. With an increased content in uric acid of the blood there is almost constantly an elevation of blood pressure, and with it a long step forward is taken toward the development of arteriosclerosis. The findings

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[12] Sommer: Radium und Radioactivität bei Altersschwäche. Emanation und Emanationstherapie, München, 1908.

[13] Walder: Radiumemanation als Heilmittel, Dissertation, Zürich, 1909.

[14] Gottlieb: Wiener med. Woch., 1910.

of Prof. Hiss[15] show clearly that through the use of radium emanations the blood entirely loses its content of uric acid, and the patient feels, as he says, "born all over again!" This explains the excellent effects of these emanations in gout and rheumatic disturbances.

As with thyroid treatment, the use of radium baths is followed by a marked increase in the output of urine, and in addition uric acid and sodium chloride are eliminated in larger quantities—a fact of great importance in diseases of the kidneys. I would personally not advocate the use of such baths in the latter disease, however, for such emanations have been found to act very unfavorably in renal disease, increasing the albumin content of the urine.

Radium baths also have a marked influence upon the blood pressure, and a considerable drop from a high blood pressure can often be observed after their use.

Upon combining the radium baths with gland treatment the results obtained are more satisfactory, as I was able to observe in several personal cases.

Similar effects can also be obtained with mud baths. There have been published a series of communications demonstrating a drop of the high

[15] Hiss: Berl. klin. Woch., 1910; Med. Klinik, 1910-16.

blood pressure following the use of mud baths, provided too high a degree of heat was not applied.

These baths contain iron compounds and other mineral substances, and also the shrunken remains of plants and animals that lived hundreds of thousands of years ago. Some of the most active of this muddy earth is found in the neighborhood of Franzensbad in Bohemia, a spa used mainly for the disorders of women and having a special effect upon disturbances of the ovaries and uterus, and also, according to my observations, on the prostate. The same mud, transported to the two other spas in the neighborhood—Marienbad and Carlsbad—is used there also in the form of baths.

These baths produce effects which, although not equalling those of Joachimsthal, may nevertheless be considered as approaching those obtained there. Very probably also the mud obtained from a place in the neighborhood of Joachimsthal embodies radio-active properties. It seems to have special stimulating effects upon the sex glands, owing to its content of iron.

I have often observed, especially in women, a rejuvenating effect following the use of these mud baths. They also impart marked vigor to the muscles, but only if excessive heat in their use is avoided, for where employed too hot they may, on the contrary, induce a sensation of great fatigue. With ex-

cessively hot baths, too, the radio-active properties are lost.

It has often been noted that women using such baths look much fresher and become more slender, the baths producing a considerable loss of fat, like thyroid treatment. At the same time there is a very marked effect upon the functions of the ovaries, menstruation reappearing sometimes after an interval of months. They have been used since a long time as one of the most efficacious measures against sterility in women.

These baths also have a marked effect on sexual impotence in men. They likewise increase the sexual desire, but only if they are not applied at a high temperature, otherwise the contrary effect may result. They produce hyperemia in the pelvic organs, and it is probably on account of the improved blood supply to these organs and also to the tonic effects of the baths (if used at a moderate temperature) upon the nervous system, that a decided improvement of the functions of the male as well as the female sexual glands can be observed after their use. The rejuvenating effects are the consequence of their stimulating action upon these functions.

I hope that in these lines on rejuvenation I have succeeded in showing that our therapeutic arsenal is not lacking in means for bringing about

rejuvenation without having recourse to forcible measures such as surgical operations or other violent agencies. Here and elsewhere, in all our therapeutic activities, the main rule should be to give preference and first trial to the milder and more harmless methods. There is a Latin proverb which says: "Quid quid agis prudenter agas, et respice finem"—"whatever you do, do it prudently, and reflect upon the possible consequences."

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